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Reporting Progress

The Annual Report* of the Institute of British Foundrymen for 1954 to 1955 shows progress of real significance. There has been a gain in membership of 174. This is not spectacular, but it is at least realistic as no "dead wood" is carried and the total membership of 5,469 entitles the IBF to rank among the largest metallurgical institutes in Europe. The Report shows the very extensive activities of the Institute, embracing, as it does, the holding of an annual convention; participation in an International Congress in Florence (and this year the complete organization of a similar congress in London); the organization of a foremen's training course and a national works visits day. Another major activity is the work of the Institute's Technical Council, with its large number of committees. Finally, there is the work of publishing the *Proceedings* and the issue of numerous technical reports and other matters.

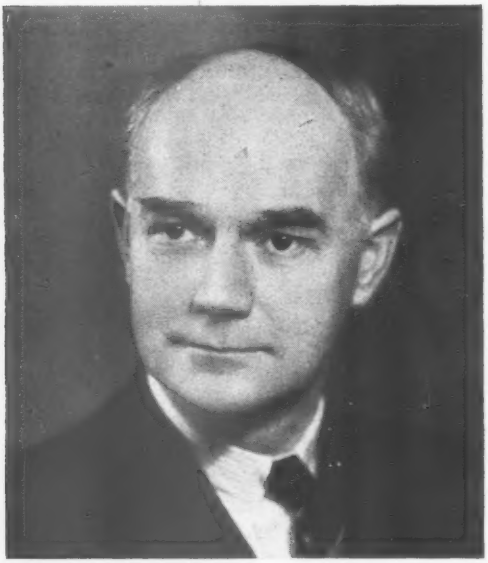
Of the membership, there must be about 480 who hold offices of some sort in major or minor activities, spread as far apart as Melbourne, Johannesburg and Arbroath. The Report rightly pays tribute to this large band of enthusiasts "whose efforts have been of the greatest service to the Council." The educational activities of the Institute are widespread and various. They include much of the work of the City and Guilds of London examinations in foundry practice and patternmaking, the organization of the foremen's training course, and helping in the selection of candidates for some of the various scholarships associated with the foundry industry.

The work of the Technical Council is the subject of a separate Report, which covers the activities of no fewer than 17 committees. Of these, none is more important in its potential impact on the future of the foundry industry than T.S.50—the one which is studying the design of castings. The number 50 is significant as it gives a measure of the magnitude of the voluntary effort which has been put into the systematic study of problems common to large sections of the industry since the inception of the Technical Council some 23 years ago. In the earlier stages, the Council did not have, as it has to-day, the close collaboration of the universities and the whole of the appropriate research associations' committees. Again, in those days it received scanty financial help—a situation which has been remedied through the far-sighted attitude of the Joint Iron Council. Since the death of the Institute's previous secretary, Mr. Tom Makemson, the conduct of the Institute has been in the capable hands of Mr. George Lambert and it is a tribute to both to say that the high efficiency of its operation is, as always, being steadily enhanced.

* See page 685.

Edward Williams Lecturer

Dr. Allibone, whose Edward Williams lecture to the Institute of British Foundrymen is printed in this issue, graduated in physics in the University of Sheffield in 1924 and obtained his Ph.D. in 1926 for research in metallurgy. He spent the next four years in the Cavendish Laboratory, Cambridge, working under Lord Rutherford on the acceleration of electrons by direct methods. For this work he was awarded an 1851 Senior Exhibition. In 1930 Dr. Allibone was appointed to take charge of the high-voltage laboratory of the Metropolitan Vickers Electrical Company, Limited, Manchester. He was awarded the Röntgen medal in 1935 and received four awards from the Institution of Electrical Engineers.



Thomas Edward Allibone, Ph.D., Sheffield and Cambridge, D.Sc., F.R.S., M.I.E.E., F.Inst.P.

During the early part of the war Dr. Allibone directed a team working on radar problems. In 1944, he went to America on the atomic-bomb project, and while in the States was in charge of a group of British and American scientific workers at the University of California under Professor E. O. Lawrence.

Dr. Allibone has directed the laboratory of Associated Electrical Industries, Limited, at Aldermaston, Berkshire, from its inception in 1946. This laboratory is concerned with long-term research problems of a physical, chemical and metallurgical character. In 1953 he was also made a director of research for the Edison Swan Electric Company (a subsidiary of AEI).

Dr. Allibone has been a member of the executive committee of the Board of the National Physical Laboratory since 1952, a Visitor on behalf of the Department of Scientific and Industrial Research since 1948, and was a member of the committee on the law of copyright which sat from 1951-52. He has recently been appointed to the industrial grants committee of the DSIR. He has served on the I.E.E. Council three times, has been a vice-president of the Institute of Physics, is a member of the Council of the British Electrical and Allied Industries Research Association and of the Council of the British Non-Ferrous Metals Research Association.

In 1946 Dr. Allibone gave the I.E.E. Faraday lecture "Atoms, Electrons and Engineers." He is the author of papers on high-voltage and transient electrical phenomena, developments in nuclear energy and its industrial appplications, new materials in engineering, etc. He has broadcast in the B.B.C. sound and television programmes on a number of occasions.

(Continued at foot of col. 2)

Instrument Industries' Exhibition

At the British Instrument Industries' Exhibition, staged at Earls Court, London (June 28 to July 9), the research worker and industrialist will be able to study the application of the products of some 160 of the finest intrument makers in the world.

The "Electronic Brain," or electronic digital computer, now produced commercially as standard equipment, will show how diverse and complicated mathematical problems can be completed in one hour against the two years taken when using conventional methods. There will be robot apparatus for the detection and measurement of smoke and of "smog," and at the same time much increasing boiler efficiency. Flame-failure apparatus will show how alarms and signals can be automatically brought into action if the firing of oil-fed burners should fail. One firm will show a balancing machine so accurate that the gravity of shafts and rotors can be balanced to about 5-millionths of an inch, and a sound-level meter that will detect sound so quiet that it would need an area as large as Great Britain to collect. Drawing-office equipment will include a new Planimeter which will give the area of an irregular figure in a minute or two without requiring any special knowledge or skill. Another manufacturer will exhibit special pencils with light-excluding properties enabling photographs to be made direct from pencil drawings.

There is a series of photo-electric devices which will measure the gloss of paint, and give it colour composition, measure the growth of bacteria whilst still in their test-tubes, and others which reduce the time taken for difficult chemical analyses from two days to one hour. Related to the gas industry, and for those engaged wherever noxious gases or fumes are likely to be present, is a new automatic alarm-system that will give visual and audible warning when dangerous conditions have been reached.

IBF National Works Visits Day

The sixth annual National Works Visits Day of the Institute of British Foundrymen will be held in the Bristol area on Friday, October 7. These visits days, which have been a conspicuously successful development of the Institute's activities, are particularly intended for those members who cannot spare the time to attend annual conferences but wish to take part in a national gathering of shorter duration.

Amongst the firms which will be visited are Westinghouse Brake & Signal Company, Limited, Stothert & Pitt, Limited, Newman, Hender & Company, Limited, T. H. & J. Daniels, Limited, R. A. Lister & Company, Limited, the National Smelting Company, Limited, Charles Hill & Sons, Limited, Jefferies, Limited, Bristol Aeroplane Company, Limited and Douglas (Kingswood), Limited. The day will conclude with a dinner and entertainment at the Grand Hotel, Bristol, in the evening.

IBF Edward Williams Lecture, 1955

Metals, Perfect and Imperfect*

By T. E. Allibone, Ph.D., D.Sc., F.R.S.

Metallurgy is an old art which has received tremendous impetus from the growth of modern atomic science. X-rays were used shortly after their discovery for the examination of flaws in metals; as each element has its own characteristic X-ray spectrum, analysis of metallic composition by X-rays became possible and in this way Sir R. Hadfield examined the alloys made by Michael Faraday without in any way damaging them; analysis of the patterns produced when X-rays are reflected by metallic crystals revealed the crystalline structure, the sizes of the grains, and the extent to which these were regularly orientated; radioactive elements were used to study the rate of diffusion of atoms in solid metals at room temperatures; then came diffraction of electrons at a surface, revealing to us the nature of surface layers; and then the electron microscope to open up a world beyond the limit of the light microscope almost as extensive as the world revealed to us by the light microscope. The mass spectrograph which was developed purely as a means of identifying isotopes and measuring atomic masses to a high degree of precision has been applied to the analysis of metals to discover impurities present to one part in a hundred million, and by using radio-active tracer elements or by exposing metals to neutrons in a nuclear power reactor, impurities of concentration one in a thousand million have been revealed.

Thus the stage is set for a technological advance in metallurgy stemming from a far more accurate knowledge of metals than hitherto available. Theories advanced years ago to explain behaviour of metals can be put to the test with the aid of these powerful new weapons of analysis, and we may well see progress in the understanding and fabricating of metals as spectacular as we see progress in the chemical and physical world.

I shall review briefly the development of our knowledge of metallic crystals and indicate the directions from which further advances are likely to come.

The Perfect and Imperfect Crystal

In the crystals of a pure metal the atoms take up a regular pattern, being attracted to one another by long range forces, and repelled when very close together by short range forces. Scientists cannot yet perceive with the electron microscope the atoms arranged in a crystal though they can see certain crystalline assemblies of the larger molecules and observe their regular arrangement which agrees with deductions drawn from the intensity of X-rays reflected by a crystal. There exists an approximate knowledge of the magnitude of the attractive and repulsive forces between atoms of the same element and from this there can be calculated the force which should be necessary to shear a crystal; its magnitude is a few per cent. of the modulus of elasticity and exceeds a thousand fold the forces which suffice to cause permanent deformation in any of the pure metals (for example, pure aluminium crystals will deform with a force of 100 lb. per sq. in.; the theoretical shear strength is 150 ton per sq. in.). This calculated value of the shear strength of the perfect crystalline lattice has received confirmation from experiments of Professor Bragg and his students[1] who studied the behaviour of a raft of soap bubbles of exactly the same size floating on water when subjected to shear forces; these bubbles are held together by surface tension and are kept from collapse by internal pressure acting over the areas of contact of each bubble with its neighbours; Figs. 1 and 2 show two forms of these " bubble rafts." By correct choice of bubble radius the interaction laws could be matched to those of metallic atoms and the shear force calculated; close agreement was found with the experimental value of the critical shear strain. If in these rafts there were departures from perfection quite small forces served to shear a raft: careful inspection of Fig. 1 (*a*) will reveal that this lattice is slightly curved and distorted so that the upper half of the lattice accommodates an extra vertical column of bubbles compared with the lower half—the resulting distortion is better seen by looking in the direction of the arrow at the photograph tilted to a steep angle. If the distorted region be enlarged as in Fig. 1 (*c*) it is noticed that atoms A.A′. A″. are equally spaced, but at the region of distortion, B.B″. is greater than B.B′. so that the potential energy of the array here is greater than in the region of A.A′. A″., and only a small shear force is necessary to cause the arrays to interchange their respective energies and for the whole of the upper rows 1 and 2 to move along—or slip—over the lower rows 3 and 4.

The local distortion could be caused in a number of ways such as by curvature of the lattice, by insertion of a bubble—an impurity atom for example—having a size different from the majority, or by the intersection of two independently developed perfect rafts of slightly different orientation—as in Fig. 2, and in all cases of distortion the force necessary to cause slip was smaller than in the perfect raft. If Fig. 1 were a three-dimensional model with the local distortion in the region near B, the distortion would also extend perpendicularly

* Delivered to the annual conference of the Institute of British Foundrymen and the International Foundry Congress on Tuesday of this week. A brief biography of Dr. Allibone is given on the facing page.

Metals, Perfect and Imperfect

to the array, and the line of distortion so created is termed a "dislocation." That slip across complete planes in a single crystal occurs at low force is an old observation ; the bubble raft gives a qualitative indication of the ease with which a dislocation can move along the slip plane at a yield stress well below the theoretical force for a perfect crystal but it does not account for the amount of slip frequently observed in a strained single crystal.

If the dislocation extends to the outside face of a crystal a step appears in the surface which is all-important in considering the mechanism of crystal growth. In Fig. 1(*b*) the array of bubbles in Fig. 1(*a*) containing the distortion has been cut and the distortion appears at the right-hand boundary of the crystal and exhibits this step; in Fig. 3 the arrival of the dislocation at the right-hand face of a crystal is shown diagrammatically in three dimensions. If the crystal incorporating this dislocation had been

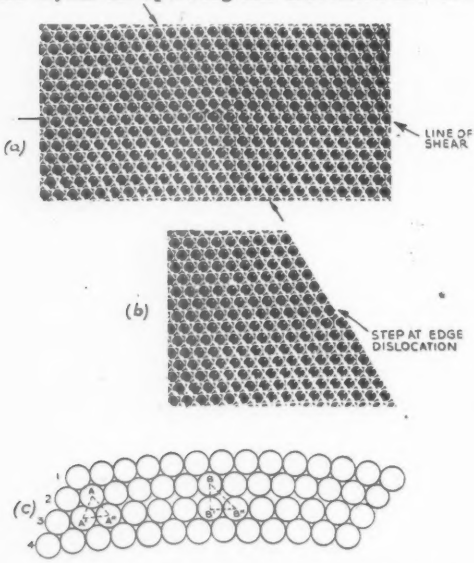


FIG. 1.—*A dislocation in a bubble raft (after Bragg and Nye). (Sketch (c) shows the accommodation of an extra bubble in rows one and two due to slight curvature and distortion of rows three and four. Note AA′=AA″ and BB″>BB′).*

growing from a solution or condensing from the vapour phase and had been in near equilibrium with the liquid or vapour, atoms arriving on the surface as at X would migrate freely over the surface bound only by very weak forces unless in migrating they encountered this step : here they are bound by two planes of attachment as at Y, whilst further atoms X′ migrating to Y have three planes of attachment, thus greatly decreasing the tendency for the atom to re-enter solution or to re-evaporate.

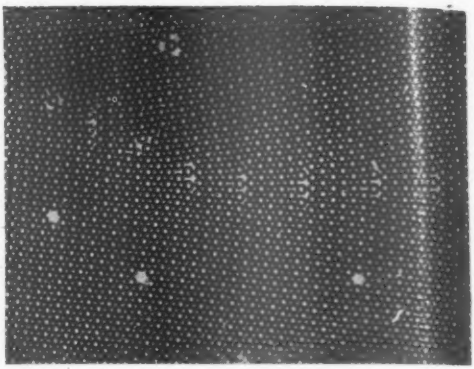


FIG. 2.—*Grain boundary between two independently developed perfect rafts (after Lorner and Nye).*

It will be seen that as atoms continue to condense by two or three point attachment at the step, the step advances in anti-clockwise direction as indicated by the main arorws, and can continue in this manner by repeated revolutions so perpetuating the original step. This concept of crystal growth accounts for the great speed with which single crystals can be grown from solution, for without such a mechanism great super-saturation would be necessary, or nucleation would have to occur spontaneously at many centres, a process hardly likely to grow a large single crystal.

Examples

These screw-growth patterns have been observed in the last few years in a wide variety of substances crystallizing from solution and from the vapour phase. The large paraffin molecules crystallize as in Fig. 4 out of petroleum solution in monomolecular steps measured[2] with the electron microscope to be 43 A.U. high; crystals of silicon carbide grown industrially in an electric-arc furnace exhibit[3] spiral stepped growths also one molecule high (Fig. 5); crystals of many compounds having the plate-type structure similar to mica grow[4] in high steps of hundreds of molecular diameters, but metals have been found[5] to grow from the vapour phase only in monatomic steps. The metal steps are too shallow for direct observation in the electron microscope but by a strange discovery they can now be seen[6] with the phase-contrast microscope: if after a silver crystal has grown it is mounted with plasticine on a microscope slide a tarnish develops preferentially on the edge of the monatomic step and is of such bulk that the tarnish can be seen by phase contrast, thus revealing as in Fig. 6 (*a*) the contour of the spiral growth in monatomic steps.

Fig. 6 (*b*) is an interesting example of the same technique revealing a unit slip which developed whilst the silver crystal was growing at a tempera-

ture close to the melting point—probably some internal strain within the substrate was suddenly released causing a unit step dislocation to travel to the surface. Single crystals of titanium deposited[7] electrolytically from one of its fused salts have exhibited growth spirals having a step height of 100 Å.U. It is clear that the mechanism of crystal growth by this spiral step process is well established for crystals growing from solution or from vapour but it is too early to say whether this is the predominant mechanism: so far no cases have been reported of crystals growing from the melt in this form, but the evidence in its favour may well be obliterated as the solid crystal is raised from the melt for examination.

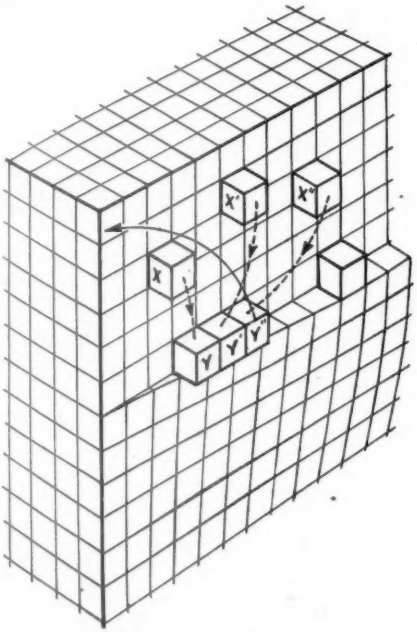


FIG. 3.—*Edge dislocation producing a step on a crystal face; growth of crystal at this step.*

Another form of crystal imperfection which has assumed great importance is illustrated in Fig. 7,[8] it is referred to as a "screw dislocation" in contrast to the edge dislocation already illustrated. Here the rectangular area ABCD of atoms represented by distorted cubes has slipped by one atomic diameter as far into the crystal as the line AD so that at the top surfaces the atoms originally in one plane are now on a spiral ramp. The line AD is the axis of this screw dislocation, and if the crystal is growing from solution the mechanism of growth is similar to that presented in Fig. 3, spiralling around A anti-clockwise and thus building up on the ramp BEFGH.

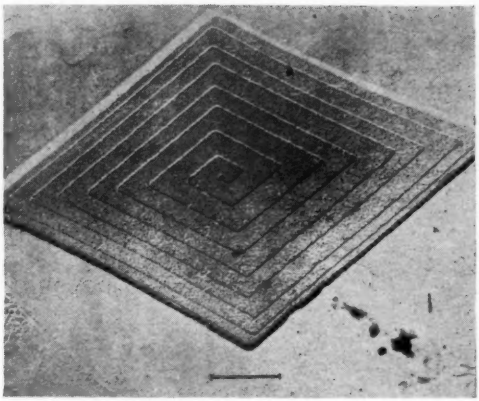


FIG. 4.—*A spiral growth step on a crystal of paraffin: $n-C_{36}\ H_{74}$.*

Grain Boundaries

In Fig. 2, two perfect bubble-rafts with axes oriented at a very small angle meet[1] with slight local distortion of the lattices culminating at a number of dislocations which in the three dimensional solid crystal would be edge dislocations normal to the plane of the paper. Where these emerge at the surface of a crystal, surface forces are stronger and it is not surprising to find greater chemical activity at these sites when the surface is etched. The line of etch pits in Fig. 8 was found[9] on a single crystal of germanium grown from very pure melt; the mis-match of orientation is only 28′ of arc and the separation of the etch pits, 3μ, corresponds exactly with the known lattice spacing and mis-orientation. This prompts the question, as yet unanswered, as to whether every etch pit is produced only where a dislocation meets a crystal surface. Etch pits form at the centre of growth spirals which suggests[10] that they originate from the same basic cause which grew the screw dislocation.

FIG. 5.—*Growth spirals on silicon-carbide crystals; the steps are each one molecule high.*

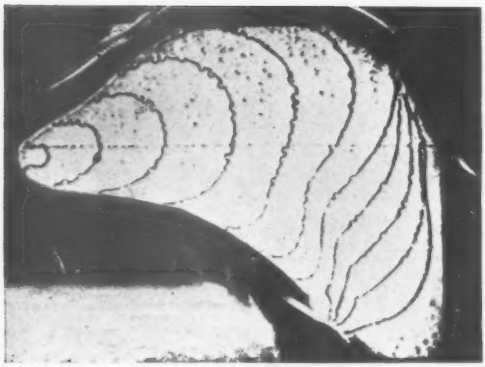


FIG. 6 (*a*).—*Monatomic spiral growth of a silver crystal.*

If a single crystal of pure metal is strained and then annealed and etched a mosaic of sub-boundaries within the grain is revealed[11] as in Fig. 9. Impurity atoms as the cause of the preferential etching can clearly be ruled out; it can be presumed that the anneal has allowed individual rafts of atoms to regain perfect orientation within themselves leaving slight tilt—tilt boundaries—between separate rafts, thus creating a multiple polygonal array and the example provides further evidence that the increased surface energy at edge dislocations is responsible for these etch pits. (Of course, in very impure metals chemical reaction will be concentrated on crystal boundaries in which impurity concentration is high.) This orientation by the movement of dislocations during anneal can be followed by observing the X-ray reflections from the crystal.

Evidence of movement of a grain boundary due to internal forces was mentioned in connection with Fig. 6 (*b*). Evidence of movement of a small angle tilt boundary under externally applied stress has been obtained[12] in a zinc crystal clamped at one end and loaded at the other, see Fig. 10 in which the stress is first increased and then decreased in consecutive pictures, the tilt boundary finally returning to its original position. Here we have a technique for studying the forces necessary to move boundaries at different temperatures and under different types of stress, and to observe how boundaries alter as they pass and repass barriers which impede their motion; in time there may be forthcoming direct evidence about fatigue and creep with the aid of this technique.

Slip Bands

When the shear-strain limit is exceeded in a single crystal, the simple description given above and illustrated by the bubble raft model implies that as the dislocation moves across the crystal as in Fig. 1 the upper rows of atoms move over the lower rows by a distance of one atomic diameter. The only direct evidence for such small amount of slip—monatomic—is provided by the bending of the growth spiral steps in silver, shown in Fig. 6. The classical observation on slip in single crystals is that slip occurs over many thousands of atomic diameters in the slip direction and is mostly confined to a few lattice planes. Recent work[13] with the high resolution of the electron microscope has shown that single crystals of very pure metal slip on many planes closely spaced: one "coarse slip" is revealed as a group of four or five planes spaced 200 Å units apart, each slipping 2,000 Å units, as shown in Fig. 11. As the stress on

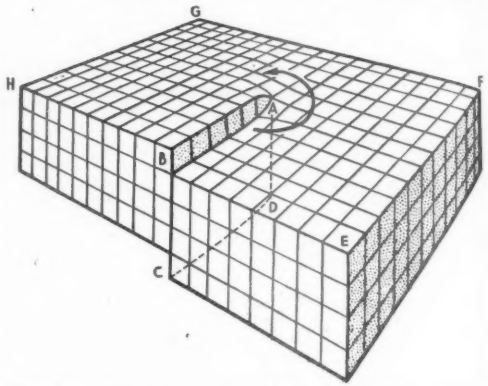


FIG. 7.—*A step on a crystal face caused by a screw dislocation.*

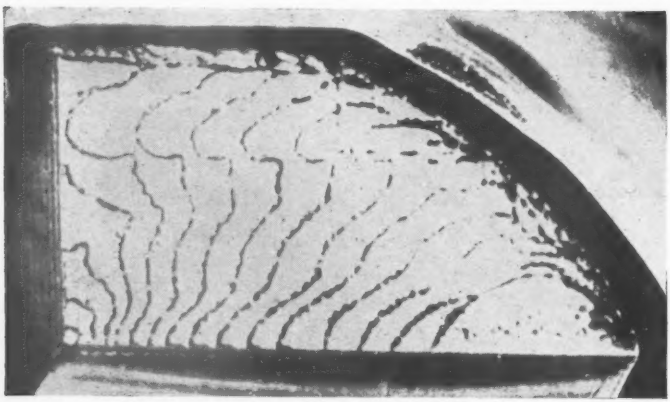


FIG. 6 (*b*).—*As* 6 (*a*) *but during growth slip occurred in the underlying crystal.*

a fully annealed electro-polished single crystal of aluminium is increased, a 2,000 Å units slip occurs on a number of slip planes spaced a thousandth of a centimetre apart, with increasing stress slip of the same amount then occurs on planes midway between these initial slip planes; then with still higher stress a number of slip planes spaced only 200 Å units from these main planes develops—and again slide distances of 2,000 Å units, until finally at 90 per cent. of breaking stress, the groups of four or five "fine-slip" planes have fully developed.

There is some conflicting evidence[14] that each slip plane moves only 150 Å units and that the amount depends on the state of the surface of the crystal but at least the amount of slip depends on the purity of the metal, being smaller the greater the impurity content. But in any event we have to explain a total movement of hundreds of atomic diameters at each glide, the complete absence of further movement along the same slip plane even though the stress be increased ten times, a wide spacing between the main coarse slip planes, and a 200 Å units spacing between "fine slip" planes.

The explanation of the large slip involves a mechanism closely related to the growth spirals already described. If in Fig. 12 D.D′ represents[8] a dislocation in a glide plane anchored by various methods at D and D′ so that these ends of the dislocation cannot move through the crystal as can a simple edge dislocation illustrated in Fig. 1, and the crystal be strained at this glide plane, atomic slip will occur successively over areas shown shaded in the sequence of pictures, Fig. 12 (*a*) to (*e*). If in extending as far as the boundary in *e* the surface of the crystal is reached, the whole of the crystal above this plane will have moved on by one atomic diameter but the original dislocation D D′ will still be present and the operation *in the same plane* can be repeated under stress. In this way slip can occur, and quickly too, until some process arrests the movement. What this process is is still conjectural, and so is the explanation of the spacings between slip planes. Superficially one can say that the material adjacent to a slip band is work hardened, but a complete quantitative explanation has not yet been accepted, and it is doubtful whether the full experimental evidence is yet to hand.

Number of Dislocations in a Crystal

The number of dislocations is clearly a function of the amount of work done on a crystal and its impurity content; single crystals can now be grown with such freedom of strain that the number of dislocations counted per unit area is smaller than in older work, a figure of 10^4 to 10^6 per sq. cm. being derived from the number of etch pits. Their origin cannot yet be fully explained; as a crystal grows from a seed, internal thermal strains already referred to may cause tilt-boundaries to occur between different parts of a crystal. Even a very small seed crystal, say 0.3 mm. diameter, will contain many dislocations at its surface which will perpetuate strains in the newly growing crystal. Also, it is difficult as yet to prepare metals with

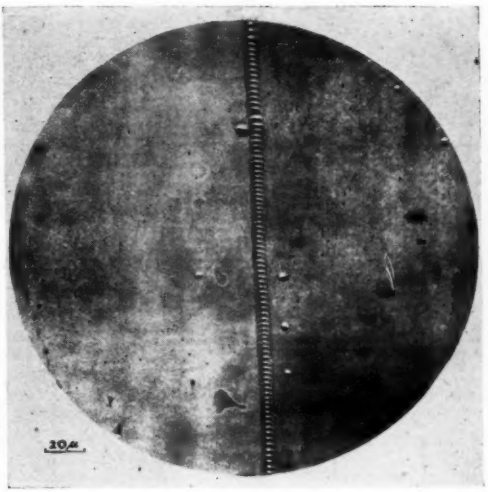
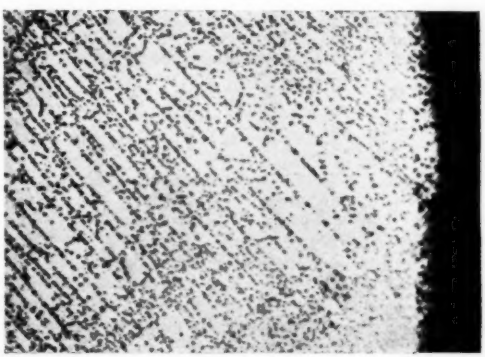


FIG. 8.—*Line of etch pits in a single crystal of germanium formed at the end of a succession of edge dislocations along a "tilt boundary."*

impurities lower than, say, one part per 100,000 which might in consequence yield 10^4 dislocations per sq. cm. One might ask what would be the nature of a needle-like crystal of area less than 10^{-5} per sq. cm. By a curious observation such crystals are now known for a number of substances and their properties have been studied. They were first found growing out of zinc-coated surfaces[15] similar to the way in which mercury aluminium amalgam "whiskers" will grow out of an aluminium plate, and they were of about 2.10^{-4} cm. dia. and ¼-in. long. Similar whiskers of tin were found[15 16] growing out of tin-plated metal.

The whiskers had quite remarkable mechanical properties; they could be bent over a wire of small

FIG. 9.—*Single crystal of aluminium—strained, annealed, and etched—producing a mosaic of sub-boundaries.*



Nomogram for Ordinary Cast Iron

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DISCUSSION

MR. E. M. CURRIE said he had looked at the matter from the standpoint of a man who had to produce castings for customers and he had the feeling that Mr. Thegel's Paper was, from this viewpoint, little more than an interesting statistical exercise. In producing the nomogram the Author was following on similar nomograms produced by Maurer and others. The reason why he made the criticism (and he did not mean it unkindly, because undoubtedly papers such as this made foundrymen think about the physical properties they were going to get), was because Mr. Thegel said it was produced for the purpose of being an aid to *practical* foundrymen, and it was at that point that he begged to differ. The application of the carbon, silicon, and phosphorus quantities related merely to hardness figures, determined on test-bars of various sizes, 20 to 400 mm. dia., was insufficient data. From the practical foundryman's point of view, that had no bearing whatsoever on the physical properties of a casting where strengths, in the way of tensile, compressive or perhaps fatigue, had to be maintained in a casting.

He knew Mr. Thegel's foundry, and in their case, working on diesel-engine production, the question of physical strengths in various sections was very important indeed, but hardness played only a small part. He noticed also with mild regret that Mr. Thegel had said that phosphorus content, if it were to be included, might be specified by the customer. That, he thought, was an undesirable suggestion from the ironfounder's point of view.

MR. THEGEL agreed that tensile strength was of importance in many cases, but thought he was correct in saying that there were also many cases where hardness was essential. He had talked about ordinary iron for ordinary use, not for specialized use. As to phosphorus, let the customer tell founders what phosphorus content he desired. Founders might not like it, but sometimes a customer would state his requirements and then founders had to meet them.

MR. CURRIE asked why Mr. Thegel laid such stress on hardness. Was it to placate the machinist, or from interest in relation to the strength of the casting?

MR. THEGEL replied it was from the machining standpoint.

Importance of Hardness

MR. T. KROGVIG (Norway) said hardness was often specified. Moreover, iron had to meet a certain class of strength. He found it might often be important to be able to control both properties and there he thought the nomogram would be quite useful. As the Author had said, for ordinary iron and for a certain moulding method, a founder could build up his own diagram with that nomogram as a guide. Also, of course, it had to be a foundry which already had good control and took analyses of each melt and many other tests. At present, he thought the nomogram would be of use for larger foundries where the hardness was specified, and for two reasons: there might be a minimum hardness specified to secure good wear-resistance, or a special requirement of better machinability. That was quite important; alternatively, it often happened that a maximum phosphorus was specified, though perhaps not so much in England as on the Continent—especially with machine-tool castings.

MR. THEGEL thanked Mr. Krogvig for his kind remarks.

THE CHAIRMAN, MR. H. J. V. WILLIAMS, closing the session, thanked Mr. Thegel for his contribution and mentioned that it represented the Exchange Paper from the Danish Foundrymen's Association. He thanked him most sincerely for preparing it and for the able manner in which he had been able to put it over.

US Steel Plant for India

New steel plant in India is to be built by the Henry J. Kaiser Company, of the United States, following an agreement which it has signed with the Tata Iron & Steel Company, Limited. The plant will be built at Jamshedpur, about 150 miles west of Calcutta, at a cost of $130,000,000 (about £46,428,570); the work is scheduled for completion in two and a half years.

The Indian Government has contracted for two other steel mills, one to be built by the German Krupp Demag concern and the other by the Soviet Union. According to Moscow Radio the blueprints for the latter plant have been completed by Russian technicians. They include a training scheme for Indian operatives. Indian steel capacity is likely to be further increased by the project now being prepared by the British consortium for a 1,000,000-ton, State-owned steel plant in Durgapur, west Bengal.

Basic Materials Cost Less

There was a further fall in October in the overall level of prices of basic raw materials used in British industry from the three-year record level reached in August.

The Board of Trade's monthly index (based on June 30, 1949) fell by 1.9 per cent. to 153.0 between September and October, to which the lower prices for raw rubber (down 14.7 per cent.) and copper (down 4.8 per cent.) contributed substantially.

Prices of materials used in the mechanical engineering and electrical machinery industries, which had risen substantially over the previous four months, fell in October by 1.3 and 2.2 per cent. respectively. These decreases were mainly due to lower average prices for various brass and copper items. The price index for iron and steel products rose by 0.2 per cent., due to higher prices for tinplate and high-speed tool steel finished bars.

Output of Iron Castings

Third Quarter's Figures

In the third quarter of 1955, production of iron castings was 3.5 per cent. higher than in the corresponding quarter of 1954. In the first half of 1955, it had been 6.5 per cent. above the corresponding 1954 level. The drop in output compared with the second quarter of 1955 was of normal seasonal amount, due to holidays.

Main Sectional Divisions

In the third quarter of 1955, the production of automobile castings was nearly 15 per cent. more than in the corresponding quarter of 1954. The production of ingot moulds was nearly 10 per cent. above the corresponding 1954 level; these are mostly used in the manufacture of steel. Engineering castings output was nearly 6 per cent. up on 1954, but pipes and building and domestic castings were fractionally down, and railway castings tonnages continued appreciably below the 1954 level.

Table I shows the output of iron castings in the third quarter of 1955 for each of the six main sections of the ironfounding industry, compared with the corresponding quarter of 1954.

TABLE I.—*Iron Castings Output for the Third Quarter*, 1955, *by Sections.*

Section.	Tons.		Percentage change.
	1954. Third quarter.	1955. Third quarter.	
Automobile (including tractors) ..	109,970	126,140	+14.7
Ingot moulds	78,870	86,640	+ 9.9
Engineering and jobbing	308,560	326,840	+ 5.9
Building and domestic	129,040	127,080	− 1.5
Pressure pipes and malleable-tube fittings	158,590	153,380	− 3.3
Railway equipment	69,090	63,540	− 8.0
Total	854,120	883,620	+ 3.5

District Production

The improvement over a year ago is widely spread. In the third quarter, most ironfounding districts had a higher output than a year previously and none of the declines was serious. Of the larger areas the West Midlands again showed the greatest increase. For the first time on record it produced more than one-fifth of the UK tonnage of iron castings.

Raw Materials

The ironfounding industry's consumption of its principal raw materials, pig-iron and scrap, is shown in Table II.

TABLE II.—*Pig-iron and Scrap Consumption by Foundries.*

	Tons.		Percentage increase.
	1954. Third quarter.	1955. Third quarter.	
Pig-iron (including refined iron) ..	529,560	546,490	+ 3.2
Iron and steel scrap (about half is foundry circulating scrap) ..	677,010	699,720	+ 3.4

The shortage of hematite pig-iron has been considerably eased by higher production, and foundry stocks were re-built during the third quarter. There is a plentiful supply of high-phosphorus iron and foundries

(*Continued at foot of Col.* 2)

Notes from the Branches

South Africa

At the October meeting of the South African branch of the Institute of British Foundrymen, Mr. A. L. Bradley presented a Paper entitled "Production of Magnesia for Refractories from Sea Water." Methods used for this process in the United Kingdom are outlined and illustrations of operating plant were also shown. After a brief discussion on the subject matter of the Paper, Dr. Cooper, metallurgist of the Rhodesian Railways, asked for some first-hand information about basic-lined cupolas in the Johannesburg area. Several operators of this type of cupola replied, and in particular, it was stressed that in South Africa this lining method was particularly favoured because of the inferior type of coke (high in sulphur) which was available. One operator quoted a recent sulphur content for his iron, of 0.021 per cent. The discussion was concluded by a vote of thanks proposed by Mr. Godfrey.

Works Visit

Also in October members and guests visited the steel division of Hume Pipe Company (S.A.), Limited. The firm was established in 1919 for the manufacture of concrete pipes and in 1931 commenced the production of steel pipes. This factory was erected and production started in 1948 under the supervision of the present works manager, Mr. G. L. M. Judd. The works cover an area of 32 acres and provide employment for over 1,000 employees. The equipment installed caters for production of pipes up to 72-in. dia. by 32-ft. long, with $\frac{1}{2}$-in. wall thickness, the largest weighing 8 tons. All pipe seams are welded by the submerged-arc process and flange manufacture is facilitated by a flash butt-welder capable of joining a 5- by 2-in. section in 30 sec. The entire pipe output is tested by four hydraulic installations. A 220,000-v. X-ray plant and a ×6 to ×6,000 magnification microscope enables weld and material checks to be performed. The factory has a handling capacity for 4,000 tons of steel per month, and products are supplied for gas and water installations, to mines and uranium plants throughout the Union and Central Africa.

One interesting contract completed by this firm was the design, manufacture and installation of the recently-opened Orange Free State trunk main. 28,000 tons of steel were used for this 45-mile line of 46-in. dia. pipe, and the contract was completed in twelve months. A unique feature of this contract was the use, on site, of a portable unit to weld the pipe sections *in situ*. The unit, designed by Mr. Judd and his staff, is reputed to be the first of its type ever placed in operation on a job of this nature.

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are well stocked. However, the supply position of low-phosphorus foundry iron continues to cause concern; this quality is mainly required by makers of castings for the automobile and engineering industries.

Labour

The number of persons employed in the ironfounding industry at October 1955, was 144,727, which is 878 more than at the beginning of the quarter, thus reversing the fall in the preceding quarter. Both these movements were mainly seasonal. The increase compared with a year ago was 4,553 persons.

F. H. Lloyd's Prizegiving

Mr. M. C. Lloyd, speaking at the annual apprentice prizegiving of F. H. Lloyd & Company, Limited, said the object of the training department was to provide a steady flow of skilled craftsmen of all trades, capable of carrying on the high traditions of skill and craftsmanship handed down to them by the older generations. F. H. Lloyd were justly proud of the skill and loyalty of their workpeople. In turn the company hoped that as their training progressed, the apprentices would take a pride in the company for which they worked.

Mr. Lloyd added that the foundry training section was nearing completion and plans were in an advanced state for the extension of training department headquarters to include facilities for an apprentice club and the development of a large modern engineering training section in the grounds at the back of the house. He paid tribute to the value of the American scholarship and to the work of the training officer and his staff. Mr. D. B. Beynon gave a report on events of the past year and emphasized the man-training side of the training programme.

Then came the distribution of prizes and cash awards for technical college and works progress. This was followed by special awards and certificates for physical recreation. The "Rose Bowl" was won by the engineering apprentices, the "Sportsman of the Year" trophy being awarded to Bryan P. F. Whitehouse, a patternmaker apprentice. Mr. C. Thompson, chairman of the apprentice club, proposed a vote of thanks, saying that the apprentices were proud to belong to such a company.

The premiere of the new F. H. Lloyd film "Moulding Men," produced by the training department of the company, was next on the agenda. It showed some of the outstanding events in apprentice training during 1955.

Long-service Compressor

Holman Bros., at their Camborne, Cornwall, works, recently answered an unusual request for service information, concerning a Holman compressor which research by the company revealed was first supplied at about the turn of the century. It was still in use at a mine, Utica Lease, in British Columbia. The enquirer wrote: "There is no serial number or model nameplate on the machine, though the words Holman, Camborne, England, are cast on the side bedplates. The machine must be 38 to 40 years old and is giving excellent service. We are driving it with a Pelton water wheel at present, but we must change over to a diesel unit and must know as soon as possible what the highest safe speed would be for this compressor. We realize that the drawings may long ago have been relegated to the archives, but we are so pleased that we want to continue using it with another drive. . . ."

The company believes that this type of machine was first supplied to the famous South Crofty tin mine in Cornwall. Not surprisingly, the drawings had been relegated to the archives, but the machine was identified as a 16- by 18-in. horizontal type, with a displacement of 502 cub. ft. per min. and an 8-ft. dia. flywheel turning at 120 r.p.m. The company advised against an increase in speed for this machine.

BELARK TOOL & STAMPING COMPANY, LIMITED, have changed their address to 9, Carnaby Street, London, W.1.

Definition of Monopolies

In a letter to the President of the Board of Trade on the proposed restrictive practices legislation, the National Union of Manufacturers states that it is emphatically opposed to any restrictive practice which is shown to be against the public interest. It accepts the proposed registration procedure, and so far from trying to cripple the proposed tribunal, regards it as essential that the tribunal should be effective and of the greatest authority.

In the NUM's view the main issue is whether a statutory definition of the public interest in this matter should be attempted for the guidance of the tribunal, and it expresses the belief that such a definition is not practicable, as any general definition may well be either too narrow to be just or too wide to be effective. It suggests that the question where the onus of proof should lie depends on the determination of this main issue. If a statutory definition is practicable, the onus must lie on those practising the defined restriction.

But, believing that an *a priori* definition is not practicable, the NUM advocates a judicial procedure in which the fact that a particular practice has effects contrary to the public interest should be proved by the ordinary rules of evidence. If this is *prima facie* established, the onus then shifts to the parties to the practice to prove any beneficial effect which they claim for it. The manufacturers believe that this factual approach, whereby a judicial tribunal will assess the balance of effect, adverse or beneficial, of a particular practice, is likely to be more effective, more expeditious, and more just than an assessment by *a priori* definition; and that a single judicial decision adverse to a particular practice will in itself lead to a discontinuance or modification of analogous practices.

British Standard Revised

Manhole Step-irons (*BS* 1247: 1955)

British Standard No. 1247 for manhole step-irons, first published in 1945, has been reviewed in the light of present-day practice. It was found that the designs were still satisfactory but that there was a demand for a plain-bar corner-type step-iron and details of this type have been added to the standard. No material change has been made in the test requirements except that, since it was considered more realistic to relate the amount of bending in the malleability test to the respective lengths of the step-irons, a diagram has been included giving the distance between the tail portions to which the step-irons should be closed in order to pass the malleability test. These distances are in direct relation to the overall length of the step-iron being tested. No change has been made to the requirement that a proof-load test should be made only by arrangement between purchaser and supplier, since this has been found to work satisfactorily.

The standard now specifies a round-bar type of corner step-iron for fixing in brickwork, in addition to the types for normal use and for reinforced-concrete manholes to BS 556. The round-bar type corner step-iron is of the same type as that which has been shown in BS 1130 for some time, but was not fully dealt with in that standard; its inclusion in this standard enables it to be related to the tests for proof load and malleability applicable to the projecting types of step-iron. An Appendix gives the approved method of applying the proof-load test if required. Copies of the standard are obtainable from the Sales Branch of the British Standards Institution, 2, Park Street, London, W.1; price 2s. 6d. each net.

The Foundry Industry in Australia*

Discussion of the Australian Exchange Paper by A. W. Silvester

The completeness of the Author's survey of Australian foundry manufacturing conditions made it difficult for questioners, and comment was mainly of a congratulatory nature. Topics included stressing of problems imposed on the Australian industry by the remoteness of manufacturing centres from one another; the popularity of "block-core" moulding and the competitive position of Australian founders.

When the Exchange Paper from the Australian (Victoria) branch of the Institute of British Foundrymen—entitled "The Foundry Industry in Australia"—was presented at the International Foundry Congress held in London, THE JOINT CHAIRMAN† (Dr. A. B. Everest) said how pleased the Institute was that Mr. Silvester had prepared that Paper. Members of the Institute of British Foundrymen would know that the Australian (Victoria) branch had joined the Institute within the last year or two and it was very gratifying to have association with foundry colleagues in Australia. Mr. Silvester himself was largely responsible for the link-up of the Australian (Victoria) branch with the parent Institute in this country, and it was to be regretted that he had been unable to give the Paper in person. However, Mr. Jurss, who was a member of the Council of the Australian (Victoria) branch, and who was very well qualified to present the Paper, had undertaken to do so on behalf of the Author.

MR. P. M. JURSS, introducing the Paper, first gave brief biographical particulars of Mr. Silvester and then presented a summary of the Paper. He stated that since the Paper had been written the population of Australia had passed 9,000,000. The rate of population expansion was the highest for the Western countries, being thirty times greater than that of the United Kingdom. Also, the ruling price of pig-iron had increased to A£21 per ton.

THE CHAIRMAN, opening the meeting for discussion and thanking Mr. Jurss, said it would be rather a difficult Paper to discuss and its interest and value lay rather as a record of what had been done and what was envisaged for the future in Australia.

Problems of Location

MR. J. H. OSBORN said that during a recent visit to Australia he had seen many foundries, and had visited several friends in Melbourne who were members of the Australian (Victoria) branch of the Institute. In his opinion, Mr. Silvester's Paper gave a comprehensive account of the Australian foundry industry at the present time, but he particularly wished to stress the problems of location, as few people in England appreciated the vast size of Australia. There were only about half-a-dozen heavily-populated industrialized areas in Australia, and having travelled between several of these centres by car, he was well aware of the distances which separated them. There was some local industry in country districts, where the securing of supplies of water and power presented very real problems which few who lived in cities were readily acquainted with. Whyalla, for example, was an isolated locality in south Australia, close to one of the main sources of iron ore, and had its own blast furnaces, shipyards, and steel melting plant. Nevertheless, its very remoteness had created a demand for a wide range of castings for use as spares and replacements. He was particularly impressed by the ingenuity which had been applied there, particularly with regard to the manufacturing of manganese-steel castings.

Many foundries in the heavily industrialized areas had been visited by him, and their products examined; whilst in some instances he had had the opportunity of sampling the finished article. The General Motors' Holden car provided such an example, as he had owned one throughout his visit. It was a first-class car, well able to stand up to the rough treatment on the Australian roads. (This was not intended as condemnation of the Australian roads, which, bearing in mind the sparseness of population and distance involved, were extremely good, but as yet it had been possible to tarmac only the surfaces of the major roads, and some of the city streets.)

Corebinder Usage

In all the foundries he had visited he had found that cereal corebinders were used extensively, whilst core-block moulding was applied on a much greater scale than was customary in this country. He would like to know whether this was the case throughout Australia, or whether, merely, it was chance that had brought him to the few foundries extensively using core-block moulding techniques.

MR. JURSS, in reply, said the use of corebinders in Australia was very extensive and Mr. Osborn's observation was therefore correct. The dry-sand method of moulding had been exploited there as he could well imagine it had been exploited in this country. The trend had been away from ordinary sands towards synthetic sands, and the development of corebinders had facilitated that to a great extent.

MR. WALTER R. JAESCHKE said Mr. Silvester was to be complimented on such a wonderful compilation of the history of Australian progress and Mr. Jurss on his excellent presentation of the Paper.

* PAPER printed in the JOURNAL, August 18 and 25, 1955.
† The chair at this session was occupied jointly by Dr. A. B. Everest and Mr. W. R. Jaeschke, the latter representing the American Foundrymen's Society.

The Foundry Industry in Australia

It was most interesting to hear of progress in remote places, and those engaged in international committee work hoped that some of it was due to their work, but undoubtedly one had to give the pioneers in Australia much personal credit for the progress they were making. As Mr. Steele had mentioned earlier in the Congress, when one lacked proper tools one had to use one's brains, and it looked as though those pioneers had the brains required to make progress in those countries. It was particularly encouraging to see such advancement recorded, it made for a better future for the world as a whole and would bring nations closer together.

Competitive Position

A MEMBER expressed his delight at the Paper and said he had found particularly interesting the remarks made by Mr. Jurss, which bore out the fact of the high cost of production in Australia. On the other hand, his own company had recently encountered competition from Australia and he was wondering how a steel company out there could make steel valve-castings for the oil industry, ship them to this country, and sell them at prices below those which ruled for this country from the main steel foundries. The valve castings in question were excellent in quality and were equal in finish to those produced by any steel foundry in this country, including his own, and not one of them had failed on test. The Australian company had over here a representative who went round the country twice a year and without question accepted all scrap and gave full credit value for it.

MR. JURSS, in reply, said he would not like to hazard a guess as to how castings could be produced cheaper in Australia than in this country, but possibly it was something to do with an endeavour to find new export markets. Australia's problem was that wool had been of such high value they had all naturally been "riding on the sheep's back" and had lived very well. However, with the advent of the drop in the wool prices some other export had to be found. The castings might possibly have been produced at a loss, but as for the quality, he felt sure Australia had the means to produce castings second to none.

DR. A. B. EVEREST then asked whether the fact that the Australian pound had a different value as compared to the pound sterling might have a bearing on the matter of relative costs.

MR. JURSS replied that Australia was at a 25 per cent. discount to sterling, *i.e.*, £1 Australian was only worth 15s. sterling, and that might affect relative costs.

Concluding the discussion, the CHAIRMAN proposed a very sincere vote of thanks to Mr. Silvester for his survey and to Mr. Jurss for the excellent way in which he had presented it, and also asked Mr. Jurss, when he returned to Australia, to take back to Mr. Silvester and the Council of the Australian (Victoria) branch the parent Institute's most sincere greetings and to say that the latter looked forward to seeing more of their Australian colleagues at future congresses.

The vote of thanks was accorded with acclamation.

MR. JURSS, replying, took the opportunity of extending to the Institute of British Foundrymen greetings on behalf of Institute members in Australia. He had been delighted to have the opportunity to be present at the Congress and wished particularly to commend officials of the Institute in this country on the wonderful planning that had gone into its organization.

"Metallurgical Coke in Lorraine"

Blending and Ramming the Charge

The use of coals of poor coking quality for the production of metallurgical coke with particular reference to the use of Lorraine coals, was discussed by M. Moussu before the Joint Metallurgical Societies' meeting in Paris recently.

As is generally known, about 75 per cent. of the French iron and steel industry is concentrated in Lorraine, although until recent years only the ore was used, the local coal as mined, being unsuitable for making metallurgical coke. A solution of this problem, however, by blending and other treatment has been continuously sought, but only comparatively recently with success.

Lorraine coals have a high volatile content of between 35 and 40 per cent., and carbonized alone by conventional methods produce coke whose physical properties render it unsuitable for use in the blast furnace, or even for many industrial purposes. The apparent density of the coal alone in the charge does not reach more than about half the true density of the solid coal; and as one of the characteristics of Lorraine coal is that it does not swell during carbonization, the coke is porous and friable. A first essential has been to increase the density of the charge. The most effective method of doing this is by ramming. Other means of attaining this include dry charging and judicious sizing.

At the metallurgical coking plant, Thionville, the "Sovaco" process adopted is based upon the petrographic nature and grain-size of the charge. Coal is a heterogeneous substance comprising at least four petrographic constituents whose coking properties for a given coal are not the same. Therefore, this process employs the principle of blending Lorraine coals with other bituminous and semi-bituminous grades. Another concern in the area employs the ramming principle, using a high proportion of Lorraine coal amounting to some 65 per cent. when blended with long-flame bituminous coals. The Carling coking plant of this undertaking initiated a process in which the charge includes an addition of bituminous coal having a low-volatile content, and a moderate addition of coke breeze crushed to between 2 and 10 mm. It is of interest to note that from the end of this year, according to the author, about 35 per cent. of the coke produced in Lorraine will be made by this process.

Modern Patternmaking Establishment

New Works of Universal Pattern Company (London), Limited

Developments within the foundry and engineering industries in recent years to meet demands for increased output at lower cost, yet for products of an increasingly complicated nature, have been vigorously supported by expanding the capacity and ability of pattern and equipment suppliers to statisfy requirements. A good example of a pattern-engineering concern, which in its evolution and policy has kept pace with events, is the Universal Pattern Company (London), Limited, which recently established new workshops in a modern factory building on the industrial estate at Crawley, Sussex. This works is described in what follows.

The firm had its beginnings in the establishment of a modest master patternshop by Mr. N. C. Fisher in 1938, catering for the needs of local industry in the supply of miscellaneous models and patterns. High standards of workmanship, coupled with an enlightened conception of modern requirements, planted the seeds for the subsequent steady growth in the affairs of the business, technically and commercially. A significant rôle was played during the war, the character and strength of the firm being properly consolidated, but, as in many companies, the real challenge arose in the post-war years, when the drive for industrial expansion and exports on a competitive commercial basis gained momentum.

Evolutionary Progress

Larger and more promising premises were taken in the heavily industrialized district of Bermondsey, London. This first of all absorbed the increasing business in general patternmaking and later permitted a significant development in the manufacture of models and patterns for the automobile-body industries, a form of business requiring a strong technical organization and ample craft skills.

It was a logical and inevitable step from the high standard wooden pattern- and model-making, in which the firm had established itself, to serious entry into the field of metal patternmaking and foundry tooling. Extensions in the Bermondsey premises were made to accommodate the additional machinery installed to support this new development. It was quickly realized that only with capacity to provide precision, fully-machined equipment, having behind it good design and modern conception, would any worthwhile headway in this industry be achieved and consequently the heaviest possible investments were made in machine tools and apparatus coupled with a careful recruitment of personnel. This policy—and its proper day-to-day execution—subsequently yielded a considerable output of modern metal equipment for motor and jet-

FIG. 1.—*General view of the new woodworking shop at the Universal Pattern Company (London), Limited.*

FIG. 2.—*Section of the metal-patternmaking department at the Crawley works.*

engine castings and research models, foundry jigs and tooling, etc., which gained the company a sound reputation in this class of work. From the restrictive effect of coping with an expanding business in inadequate premises emanated the desire for greater manufacturing capacity and an opportunity was seized to acquire space and facilities in keeping with the company's progress when the establishment of the modern industrial estate at Crawley, Sussex, took place.

Move to Crawley

From the outset, bearing in mind the technical evolution of the company and the current demand for its products and services, the new factory at Crawley was planned in detail and conception with considerable foresight. This factory was occupied by most of the Bermondsey personnel, together with new recruits in April of this year and is now a fully-integrated wood- and metal-pattern and tool-engineering unit, well equipped to meet the future trends in the mass-production industries.

The old works at Bermondsey still function, reduced in capacity, as a wooden master-pattern shop, to cater for mostly local demands. Also, a nucleus foundry, which has been in operation for some time in the making of pattern castings, is under development as a specialized light-alloy foundry. Here, pressure-cast, plaster-moulded pattern castings are made regularly and plaster moulding of specialized castings is in hand.

The new premises at Crawley occupy an area of 32,000 sq. ft., divided between a woodworking shop (Fig. 1) and a metal shop (Fig. 2). Every function

FIG. 3.—*Group of metal pattern and corebox equipment produced in the new shop.*

FIG. 4.—*Vernier height gauge being used in the inspection department to check a large and intricate pattern.*

of works organization and production, administration and welfare is individually provided for. Incoming materials and outgoing products are handled at the rear of the shops, where fully equpped and modernized storage facilities are located. Administrative offices, welfare and canteen blocks flank the works on two sides and an efficient control and supervisory office is centralized between the workshops.

Wooden-patterns Section.

The shop where wooden patterns are made is characterized by an orderly and efficient layout comprising parallel lines of benches and a strategic positioning of a wide range of woodworking and patternmaking machinery, properly related to the storage of rough timber. This layout, and the abundant facilities for production, are coupled with amenities to ensure encouraging working conditions. The shop is regularly engaged in the producton of first-class equipment for the heavy engineering, marine, aircraft and motor industries.

Metal-pattern Department.

The increasing complexity and accuracy of metal-pattern and foundry production equipment necessitates resources more akin to the modern engineering tool-room than the traditional metal patternshop and this department at Crawley well demonstrates this. Here, a very large investment has been made in machine tools and equipment—notable examples are the copy milling and universal milling machines, shown in Fig. 2 (which are specially selected for the size of job that can be traversed by the milling head), precision lathes, cylindrical and surface grinders, precision borers, etc. An appreciable proportion of the patterns and coreboxes made are of the fully-machined type in cast iron, steel or brass, a group of which is shown in Fig. 3. In this category are dies for gravity-die-casting and pressure-die-casting, the manufacture of which form a part of the firm's activity. Also in hand are models for precision investment moulding and dies for wax-pattern production.

Designing and Planning

One of the most notable features of the firm is the comprehensive design and planning drawing-office. It is very well equipped and a staff of fourteen draughtsmen and designers is employed in it. The best utilization of the excellent machine-tool resources in the patternshop is only possible through the detailed planning and drawing of the simple elements in any particular job, thus avoiding errors —both reducing the responsibility of the individual patternmaker and assisting in the rapid completion of a project. The works is, therefore, regularly engaged in the manufacture of metal equipment for foundries for which purpose it produces its own designs or co-operates closely with the pattern-design departments of the larger mechanized foundries. Key members of the staff are experienced foundry engineers giving leadership in the prescription of the most-up-to-date methods and in the design of production equipment covering machine moulding, coreblowing, shell moulding, core-assembly and closing fixtures, inspection devices, spot-location fixtures, and so on. A section of the drawing office is devoted to jig-and-tool design for manufacture in the firm's own shops or by clients themselves. In addition, the unit is skilled in the design of gravity-casting dies of which a number are made for the foundry at Bermondsey.

Inspection and Standards Section

A modern inspection department is a significant component in the system of working at the Crawley factory. The large variety of complex precision equipment undertaken could not, of course, be handled without this. Consequently, nothing has been spared to provide the proper range and type of apparatus required for checking, notable amongst which are comparators and a profile projector. This inspection department (Fig. 4) is fully approved for AID and ARB inspection procedure.

After examining this new works and the projects in hand one is left with a firm conception of an example of a model pattern engineering organization, conducted in all the aspects of design, craftsmanship, production, customer-liaison, good-housekeeping and welfare with fastidious thoroughness and adequately equipped in all departments to meet the demands generated by the most revolutionary foundry developments.

AN ISRAELI DELEGATION of transport specialists recently signed a contract with the British company Leyland Motors, Limited, for 250 bus chassis, estimated at a cost of £1,000,000.

Company News

SAUNDERS VALVE COMPANY, LIMITED—Subject to CIC consent, the directors propose to capitalize £50,000 of share premium account and issue one share for every six held. Such shares will not rank for the declared interim.

FISHER & LUDLOW, LIMITED, makers of metal pressings, etc., of Birmingham—In his statement, the chairman, Mr. Arthur Keats, says that considerable sums are being spent on further expansion of buildings and plant for press shop, toolroom, and body assembly.

CRONITE FOUNDRY COMPANY, LIMITED—A final dividend of 23 per cent. now recommended makes, with the 12 per cent. interim, a total of 35 per cent. for 1954-55, as compared with 30 per cent. expected when the company sought a London Stock Exchange quotation last June.

CONSETT IRON COMPANY, LIMITED—The manufacturing and trading margin has more than doubled, at £1,999,131, for the 52 weeks ended October 1, 1955, compared with £869,189 for the previous period. Net income, before tax, has risen from £874,127 to £2,071,309 and, after tax, from £554,393 to £1,030,243.

METAL AGENCIES COMPANY, LIMITED—A rights offer to raise approximately £250,000 is announced by the directors. Ordinary stockholders registered on December 8 will be offered 939,790 5s. ordinary shares at 5s. 6d. each in the proportion of one for every two 5s. units held. Following the 5 per cent. interim dividend the directors expect to pay a final of 11 per cent.

LAPORTE INDUSTRIES, LIMITED—Acceptances following the offer to ordinary stockholders of 3,245,897 5s. ordinary shares at 12s. 6d. per share totalled over 98 per cent. Applications for additional shares amounted to more than 20 times the number of shares available. Up to 20 shares applications were allotted in full, and those for more than 20 shares were allotted 20 shares each.

SIDNEY FLAVEL & COMPANY, LIMITED, gas-appliance manufacturers, of Leamington Spa (Warwickshire)—The directors recommend a final dividend of 4 per cent., to make 10 per cent. for the year ended July 31. For the previous year a 9 per cent. final made a 15 per cent. total. After tax, etc., the net profit of £39,779 compares with £79,107 in 1953-54. It is proposed to increase the capital to £750,000 by the creation of 1,250,000 new 4s. shares.

RICHARDSONS WESTGARTH & COMPANY, LIMITED—An extra-ordinary meeting is called for December 14 to increase the capital by £2,000,000 by the creation of 8,000,000 new shares of 5s. each. It is stated that the company has no plans for issuing any further capital, but in order to obtain the maximum relief from capital duty on the increases in the issued capitals of the operating companies, it is necessary also to increase the authorized capital of the parent company.

FERRANTI, LIMITED, manufacturing electrical engineers, of Hollinwood (Lancs)—The directors are of the opinion that "it would not be in the best interests of the company to provide for their increasing financial requirements by raising additional capital on a permanent basis under present conditions." They therefore propose "to continue to avail themselves of the facilities placed at the company's disposal by its bankers" and are calling a meeting for December 15 to increase borrowing powers to £7,000,000 or the total of capital, reserves, and surplus, whichever is greater. On the basis of the balance-sheet of March last, the limit of £7,000,000 would operate.

Parliamentary

Health Hazards in Industry

Replying to DR. BARNETT STROSS (Lab.) who asked which industries were considered to bear serious health hazards for which the Industrial Health Advisory Committee had recommended voluntary medical supervision, the MINISTER OF LABOUR (Sir Walter Monckton) said the committee had recommended the stimulation of the further development of voluntary medical supervision in the steelfoundry, iron and steel manufacturing, rubber, and chemical industries.

DR. STROSS asked if there could not be an extension to all industries in which noxious fumes and dusts were inhaled by workers, and would the Minister bear in mind that in copper smelting foundries cadmium was sometimes used and the fumes from it were now known to be quite deadly in their effect.

SIR WALTER MONCKTON: "I will bring that to the notice of the committee so far as the committee is not already aware of it."

In a further question, DR. STROSS said that many employers and workers still mistakenly believed that industrial dermatitis was contagious. He asked if the Minister was satisfied that the officers in employment exchanges were fully aware that there was no such possibility of infection and what steps would be taken in the campaign against dermatitis.

SIR WALTER said he was aware that misapprehension about industrial dermatitis might still exist among some employers and workers, although the position was made clear in a poster issued by his factory department. He was satisfied that the officers concerned in employment exchanges with persons disabled by dermatitis were aware of the facts. The Chief Inspector of Factories had revised and reissued a leaflet and a poster containing advice on prevention, and further measures to stimulate the interest of employers and workers in the need for precautions were now under consideration. Special visits were paid to factories where dermatitis was known to be a particular problem and inquiries were being made into the risk of dermatitis from certain substances. Attention was also being paid to the problem in the course of the pilot local industrial health survey now in progress in Halifax.

Nickel Supplies

By far the greater part of our supplies of nickel came from Canada, said MR. PETER THORNEYCROFT, President of the Board of Trade. He told MR. FREDERICK LEE (Lab.) that there is a world shortage of the metal.

The Minister said that some manufacturers were getting less than they could use, and were unable to build up stocks. Manufacturers were buying increasing quantities of nickel from other sources, mainly from New Caledonia, but the amounts obtainable were comparatively small.

Furnace Bricklayer's Claim Rejected

The Court of Appeal has rejected the appeal of Gerald Aylmer Edwards (40), a bricklayer, of Meadow Lane, Porthcawl, whose left eye was injured while he was at work in a furnace, against the dismissal by Mr. Justice Sellers at Swansea Assizes of his claim for damages from his employers, the Steel Company of Wales, Limited. On February 5, 1954, Edwards was cutting out firebricks in the company's Abbey Works at Port Talbot, and a fragment of metal from a bar he was using struck his cheek and eye when the bar was hit with a hammer.

A Jobbing Investment Foundry in South Africa*

Discussion of the Exchange Paper from the IBF South African Branch

In the discussion, the Author was warmly congratulated on operating such a pioneer process in South Africa. Questions were designed to elucidate detail features of the methods described—crucible composition operating methods, carbon pick-up, and economics came within this category.

The Exchange Paper from the South African branch of the Institute of British Foundrymen, entitled "A Jobbing Investment Foundry in South Africa," by J. Steele, was presented on his behalf by Mr. Dunlop at the International Foundry Congress in London.

THE CHAIRMAN (Dr. A. B. Everest), opening the discussion which followed the reading of an abstract of the Paper, said he was particularly pleased to have that contribution from the South African branch, especially as it dealt with the sort of enterprise and improvization which foundrymen in the more remote areas had to adopt. It was undoubtedly an example of a job well done under very difficult conditions.

DR. REYNOLDS said there was probably only one justification for his speaking, that being that he was now concerned with the "Shaw process" of making castings. He was not a foundry engineer and he could not therefore comment on the "improvization" side of Mr. Steele's Paper; the technical processes in which he was much more interested were not the Paper's primary concern. He was currently using the "Shaw process" to produce castings mainly in high-alloy steels, in the weight range from a very few ounces up to the maximum melting capacity which he had available—something of the order of 150 lb. At the same time, he believed Mr. Dunlop would confirm that castings of very much larger individual weight were possible.

MR. M. G. DE ROZAS (Spain) asked of what material the crucible was made and how it was made.

MR. DUNLOP, in reply, said he did not know exactly what material was used for Mr. Steele's crucible, but in this country thousands of such crucibles were being made regularly. The material used here was dependent largely on what was being melted; for stainless steel alumina was very satisfactory; sillimanite could also be used, but it was possibly not just as good as alumina.

Methods of Working

MR. ARMITAGE said Mr. Steele was to be congratulated on his ingenuity in devising the plant described in such a remote area. At the best of times, the development of investment casting was a difficult business. He had been trying to follow the first paragraph in Mr. Steele's introduction: "Although the lost-wax process was not at first envisaged, nevertheless, the principle underlying the establishment of an investment foundry in South Africa was the repetitive production of small castings." What he understood from that was that the Shaw-Osborn process was started as an intermediate stage for close-tolerance castings, where pattern equipment and not wax was used, and that probably the next stage in development in order to produce parts at the lower weight range of the scale and more complex castings was to adopt the lost-wax process.

Referring to the description given of Fig. 3 . . . "a close-up view of the moulding section of the foundry. The moulding board is hinged at the back, a device which serves two main purposes: first, it forms a simple but effective vibrating table (should this be required) for compacting the investment. Second, as it can be set at any desired angle in one direction, patterns which are thicker at one side than the other can be moulded at an angle . . . ", Mr. Armitage said he could not see from the illustration how that was possible.

Finally, he would like to direct a question to qualified metallurgists in the audience, to learn their reaction to stainless-steel castings containing up to 0.4 per cent. carbon. Mr. Steele had said that he had done very well with them, but he thought if that were suggested in this country there might be trouble.

MR. DUNLOP, in reply to the last question, said Mr. Steele was very conscious of the undesirability of such carbon pick-up but, as was stated in the Paper, contract work was undertaken by his company prior to the receipt of melting equipment from abroad and when the melting equipment arrived it was just impossible to make it work and so the firm was confronted with orders that had to be met. They had therefore attempted to make the castings required by using the two forced-draught coke-fired pit furnaces, with the result that carbon pick-up had occurred. The castings were submitted for testing and were found to be satisfactory, so the firm had completed the order. However, as was explained, more-conventional and better melting equipment was now in process of being installed.

With regard to Fig. 3, in making a "Shaw-process" mould it was quite unnecessary to vibrate in the generally accepted sense of the word. No vibration such as was usual in the lost-wax investment process was necessary and a very common method was for the operator to bump the board three or four times after filling, so Mr. Steele had hinged his table and when the mould was on the table he "vibrated" it three or four times in this way. If he was making a casting where it would be expensive to make the whole shape he tilted the mould

* Paper printed in the JOURNAL, November 17.

at an angle and used the board for that purpose.

Referring to the lost-wax process, Mr. Dunlop said he did not think the company had first envisaged casting by this process, but since the Paper had been written he understood Mr. Steele was doing lost-wax casting elsewhere, so probably he had been referring to that.

MR. ARMITAGE said the " Shaw process," as he understood it, did not involve the use of wax patterns: for with a sand-to-sand joint for the two halves the former one had a fairly simple pattern on which to invest directly but in the lost-wax process one could make a very complex wax pattern with practically no visible parting line which one could completely surround when investing.

Processes Explained

MR. DUNLOP, further replying, said in making a casting by the lost-wax process one had a multi-piece die to produce a one-piece model which was expendable: in the " Shaw process " one had a non-expendable model and then made a multi-piece refractory mould. He would agree that for the smaller range of castings, if the quantity justified the making of die equipment, the lost-wax process might be the better method of manufacture. It was not claimed that the " Shaw process " was universal in application. As had been pointed out earlier that day,† there were many processes available, giving various degrees of accuracy and surface finish and covering various sizes of castings from a few ounces to many hundredweights, and the skill lay in selecting the right process for the job. Steel castings had been made by the " Shaw process " up to 600 lb. individual weight as a regular job, and one company making iron castings had gone as high as 11½ cwt. Technically there was no limit to size.

MR. F. A. MARTIN said he had not much of technical value to add although he could claim to have experience of the process for a greater length of time than most others, starting when it had the original name of the Shaw-Osborn process. He, the speaker, had seen the foundry in South Africa in 1941. At that time, Mr. Steele was not working on the investment process at all but was beginning to get down to all types of precision casting. He was operating the shell-moulding process out there when people in this country were only talking about it, and he had not been afraid to tackle the job.

Economics

One question which he would like to ask was with regard to economics—Ethyl-silicate was expensive and he was not quite sure how Mr. Steele managed a casting weighing 193 lb. on an economical basis. Possibly he did not, but in any case he was doing an extremely good job out there and the Institute, he was sure, was proud to number him among its members.

MR. DUNLOP, in reply to the question on economics, said that many foundries were using ethyl-silicate as a binder, selling their castings, and making a profit. He agreed that the moulding material plus the binding liquid was expensive but at the present time work was being carried out on techniques, where, on big moulds, one only used ¼-in. thickness of the more-expensive material.

MR. J. H. OSBORN also congratulated Mr. Steele on the way he had tackled a technique, which had been known in this country for over ten years. He confirmed that initiative and thought were essential if the process was to be applied effectively. South Africa provided ideal scope for the process, because many normal manufacturing facilities were in many instances not available, and unorthodox techniques had to be found to overcome day-to-day emergencies. The Shaw-Osborn process, as it was originally called, provided a means of casting difficult items required as spares or replacements at short notice. In South Africa, the price such a service could demand was high.

Requirements

To operate the process, regular supplies of a special Silester casting solution were necessary. This solution would only keep for two or three weeks. In this country, transport from a supplier presented few problems compared with those that had to be overcome in South Africa. It would be interesting to know how readily raw materials, including sillimanite, could be obtained for operating the process in South Africa.

As regards application, his own company had found that they could produce difficult castings by the Shaw-Osborn process, which could not be tackled by normal foundry techniques. Such castings had presented many problems, but they had been rewarded by the high market price which such a product could command. The Osborn-Shaw process was costly to operate, but there was a place for it alongside the CO_2 Process and other new processes. Nevertheless, these other processes might in time severely restrict the field unless the first named could be made less costly to operate.

MR. D. F. BAILEY asked what Mr. Dunlop considered would be the application of the Shaw process for making shell-moulding patterns in iron and gunmetal. In reviewing the Paper Mr. Dunlop had mentioned accuracy limits of ±0.005 in. per inch. He did not know whether those were intended to refer to small castings, but if one had a casting 10-in. long the accuracy then would not be good enough.

MR. DUNLOP, in reply, said the accuracy possible was ±0.005 in. on dimensions up to 3-in. and beyond that an overall tolerance of ±0.015 in.; he made that statement knowing that such limits could be met easily. With regard to furnishing patterns and coreboxes for shell moulding he did not know a better method than the one being discussed, and the process was being used to produce such equipment at a very economic price.

A Pilot Plant

MR. SHAW said he did not intend to speak on the technical side, but felt he perhaps ought to reply to one or two of the questions relating to the par-

† During the discussion of the American Exchange Paper " Evaluation of Casting Processes " by Hiram Brown, B.S.

ticular plant in South Africa, about which he had possibly more information than anybody else. The ethyl-silicate question which had been raised was, of course, essentially answered in the Paper, but he ought to make clear the fact that the initial purpose of establishing the unit to which Mr. Steele had referred was to encourage other people in South Africa to use the process. The price of ethyl-silicate certainly was a matter of major importance in the process, and until usage increased, there could be no early prospect of reducing that price, which was indeed quite reasonable in respect of what was a rather complex process. The major possibility for the future lay in the development referred to by Mr. Dunlop, *i.e.*, in using cheaper materials on every part of the mould where the better material was unnecessary.

On the motion of the CHAIRMAN a hearty vote of thanks was accorded to Mr. Steele for his Paper and to Mr. Dunlop for presenting it.

Hot-tinning of Cast Iron*

By C. J. Thwaites, B.Sc., A.R.S.M.

[Abridged]

Cast iron has always been considered to be a rather difficult material to tin by the hot-dipping process. The difficulty arises from the presence of graphite in the structure of cast iron which can appear as outcrops or smears at the surface. Broadly speaking, suitable preparation procedures aim either at removing surface graphite, or at covering it over with a readily-tinned metal. Such processes as the Kolene process and the T.R.I. fused-nitrate process remove the graphite by oxidation. The second category of processes involves plating with pure iron or copper prior to tinning.

During the war years, efforts to discover a less-complicated procedure for a specific task, resulted in the development of the T.R.I. fused-chloride process. In this procedure, surface graphite is partially removed by grit-blasting and the surface is finally prepared by a short immersion in a eutectic mixture of sodium and zinc chlorides at about 300 deg. C. The use of fused chlorides instead of acid for final pickling effectively prevents graphite smear.

Recent Modification

More recently, a modification of this procedure, which is called the *direct-chloride method*, has proved very successful in certain applications. The method was first developed for certain high-phosphorus irons found not to be amenable to tinning by the fused-chloride salt-bath method due to their susceptibility to over-treatment. It has since been found to be generally applicable to grey cast irons and has been used successfully for Meehanite and spheroidal-graphite irons.

The method may be found particularly useful for articles of very varying section where, with the fused-chloride process, over-treatment of the thinner sections is always a difficulty unless pre-heating is used. It depends for its success on careful and complete grit-blasting of every portion of the surface to be tinned. The operations to be carried out on the castings are:—

1. Blast thoroughly with No. 70 angular steel grit, *i.e.*, grit which passes a 70-mesh per in.

2. Degrease by the trichlorethylene-vapour method. If a very smooth surface is essential, a water-barrelling operation may be inserted at this stage.

3. Dip in aqueous flux of following composition:—

Zinc chloride	24 lb.
Sodium chloride	6 lb.
Ammonium chloride	3 lb.
Hydrochloric acid	2 pints
Water	10 gall. (100 lb.)

All surfaces of the casting must be wetted by the flux. Delay between operations (1) and and (3) should be kept as short as possible.

4. The casting is then lowered slowly into the first tinning pot, the surface of which is covered by a layer of flux at least one inch thick.

The flux contains—Zinc chloride, 8 parts; sodium chloride, 2 parts; and ammonium chloride, 1 part, and must be kept in a freely ebullient condition by frequent additions of water.

With large articles, which must necessarily be immersed rather slowly, there may be some risk of drying of the aqueous flux on the upper parts before immersion is complete. This will inevitably lead to imperfect tinning and must be prevented by spraying with water or an aqueous flux-solution from a fine rose or any simple spray gun. The temperature of the tin should be in the range 300 deg. to 320 deg. C.

5. Although the piece should accept the tin within about one min., it is advisable to allow a "dwell" in the tin-pot of at least 5 min. This prolongation of time allows escape of flux residues and greatly minimizes risk of "sweating" in the finished coating.

6. After removal from the first tin-pot, subsequent tinning and manipulating operations are as normally practised.

Although the direct-chloride process has been used mostly for providing tin coatings for protection, some information is available on expected adhesion values when the method is used as preliminary to bonding Babbitt alloys to cast iron. As good or somewhat better adhesion figures than those usual for the fused-chloride process should be obtained, and about 2 tons per sq. in. is a reasonable expectation. This figures is admittedly not as good as that obtainable by the graphite-oxidation processes, but such processes are, of course, more complicated.

* From *Tin and its Uses.*

New Patents

(Copies of complete specifications are obtainable from the Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

740,301. Goldschmidt Aktiengesellschaft, 15 Heilermannstrasse, Essen, Germany.

A method of improving the useful properties of flints of mischmetal (cerium) iron alloys, which contain between 10 and 30 per cent. iron with or without alloying additions after casting. The mischmetal (cerium)/iron alloy is subjected to annealing at temperatures between 100 deg. C. and the temperature at which melting begins, preferably between 350 and 450 deg. C. for a period of between 5 and 24 hours. The alloy should then be allowed to cool to room temperature.

740,323. Rolf Erhard Moren, Alfredshen, Sweden, and L. H. V. Villner, Kinnekullevagen 19, Bromma, Sweden.

A method of making moulds, and particularly cores, for metal casting, which consists of forming the mould element from sand using a binder in the form of a water-soluble cellulose derivative and baking the element at least in part by dielectric means. A typical example of a sand mix would be (by weight), 100 parts of sand, 1.5 parts of ethyl hydroxyethyl cellulose and water 6 per cent. of the total compositions and including moisture content of sand. This type of binder is claimed to have good " green " and dry strengths.

740,352. Colvilles, Limited, 195, West George Street, Glasgow, C.2.

A low-carbon steel which consists of carbon 0.03 to 0.02; vanadium 0.05 to 0.4; molybdenum 0.10 to 1.0; manganese 0.3 to 1.0; titanium 0.05 to 0.5 per cent. The balance apart from impurities being iron. This steel is particularly suitable for chromizing, with a high creep-resistance at low temperatures, for manufacture into boiler or superheater tubes. " Chromizing " is the diffusion of chromium into the surface of a metallic article by any method in which the article is brought into contact with chromium or fluid chromium compound at a high temperature.

740,353. Compagnie Générale des Conduites D'eau, Les Vennes, Liège, Belgium.

A process for the manufacture of Thomas or basic steel. Pig-iron having a high-sulphur content and a low-manganese content is produced in a blast furnace from low-acid ores by an acid process. It is then retreated in a hot-blast cupola, under reducing conditions, with a quantity of fuel in excess of that required for melting, and a correspondingly high quantity of basic slag. The iron is superheated to between 1,500 and 1,600 deg. C. It has a constant composition with a low content of S and Si, and a content of C., Mn., and P, at least equal to the starting material. The iron is blown directly in the basic convertor and refined into steel.

740,492. Societa Lorni Lubatti, Via Castelnuvo 22, Turin, Italy.

A method for the reduction of oxidic ores and oxide-containing metals by heating them out of contact with the flames of combustion. A furnace for carrying out this process is described in detail.

740,547. Deutsche Edelstahlwerke Aktiengesellschaft, 578, Gladbacherstrasse, Krefeld, Germany, and Gesellschaft für Elektrometallurgie m.b.H., 56, Grafenberger, Allee, Dusseldorf, Germany.

A process for the production of carbides of tungsten, molybdenum, vanadium, titanium, tantalum, niobium, chromium, or boron., by an exothermic method instead of the complicated chemical means usually employed.

Salvage in Industry

Recent trends in industrial development in this country show very clearly the need to export goods in which the content of British skill, labour, and craftsmanship is high enough to compensate for shortages of raw material. The need to appreciate the importance of productivity, in respect of both labour and utilization of materials, machinery, fuel management, skill, capital, and all other input factors of industry is also stressed. It is not merely a case of not wasting materials, but also of making the utmost use of what we have, particularly of scarce materials such as selenium, of which the total world supply is not great, but which is being used increasingly in the production of specialized equipment for export.

The importance of the work of industrial salvage and recovery in the interests of the national economy was emphasized by Dr. Alexander King, chief scientific officer of the intelligence division of the Department of Scientific and Industrial Research, in an address to the conference of the National Industrial Salvage and Recovery Council. Mr. King pointed out however, that productivity in the utilization of materials was equally important to the industrial firm. There were probably still quite a number of instances where large amounts of waste material of considerable potential value were not being put to use. This was due sometimes to lack of liaison between the various industries, sometimes to the lack of financial support for the necessary investigations. The time was propitious for increasing interest in the subject.

Qualcast Appointments

Promotion to departmental directorships of the first seven trainee directors selected under a scheme started seven years ago is announced by Qualcast, Limited, Derby. The directors who now take responsibility for their respective departments are:—Mr. H. A. Redshaw (foundries), Mr. M. A. Wardle (deputy to Mr. H. A. Redshaw), Mr. H. Clarke (works management), Mr. J. Higgins (production of all finished products), Mr. E. J. Appleby (secretarial and statistics), Mr. R. Harris (sales), and Mr. H. U. Redshaw (mobile, at present at the Australian plant).

Four of the new departmental directors have also been appointed as alternates to members of the main board, the alternate director in the case of Mr. J. E. V. Jobson, chairman and managing director, being Mr. H. Clarke; Mr. R. Harris for Mr. T. W. Cooper, Mr. H. A. Redshaw for Mr. J. R. Fleming, and Mr. E. J. Appleby for Mr. D. McMillan.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

CHILE, December 20—Rails, fishplates, tieplates, anchors, and compromise joints, for the Chilean State Railways. (ESB/25764/55.)

NORTHWOOD (MIDDX), January 7—Castings for the year commencing April 1, 1956, for the Urban District of Ruislip-Northwood. The Engineer and Surveyor, Council Offices, Northwood.

SYRIA, December 27—Materials for water mains at Latakia Harbour, for the Latakia Port Company. (ESB/25230/55.)

SOUTHERN RHODESIA, January 4—Sleeper-end bolts and washers, for the Rhodesia Railways. (ESB/25048/55.)

News in Brief

A £40,000 diesel test-house is to be built nearby the Derby Locomotive Works, by British Railways.

THE CONTENTS of James Watt's workshop are on public view again in the Science Museum, South Kensington.

THE SIXTIETH ANNUAL MEETING of the American Foundrymen's Society is to be held in Atlantic City, from May 3 to 9, next year.

THE ADDRESS of Mitchell Engineering, Limited, is now The Bridge, Peterborough (Northants). The telephone number is unchanged.

GUY MOTORS AFRICA (PTY.), LIMITED, has placed a contract for the erection of premises in Johannesburg and another for the purchase of land in Rhodesia.

AMERICAN STEEL FOUNDRIES announce that in future all invoices and correspondence should be addressed to them at Prudential Plasa, Chicago, 1, Illinois, USA.

DIESEL ENGINES for a Canadian tractor will be supplied by F. Perkins, Limited, Peterborough, under a contract which it has secured worth $1,000,000 (£350,000).

"BAKERS" foundry of Compton, Berkshire, is to be re-opened in January, 1956, for the production of iron castings by a new company—the B.H. & C. Foundry Company.

A TWENTY-EIGHT-ACRE SITE, formerly an amusement park, at Hope Bank, Honley, has been purchased by Brook Motors, Limited, for new factory development. It is about four miles from the Huddersfield works.

DAVEY, PAXMAN & COMPANY, LIMITED, Colchester, has received an order for 20 16-cylinder, steel-framed diesel engines, valued at about £200,000, under the British Transport Commission's locomotive programme.

DORTMUND REPORTS indicated that at least six people were killed and eight seriously injured when a furnace exploded on November 25, at the Dortmund-Hörder Hütten-Union, one of Western Germany's largest steelworks.

AN ORDER for 1,100 covered railway wagons for the Pakistan Government, worth £1,500,000, has been received by the Wishaw firm of R. Y. Pickering & Company, Limited. Delivery will begin towards the end of 1956, and is expected to take about seven months.

A £3 MILLION ORDER, comprising three vessels—two cargo and one tanker—has been placed with the Blythswood Shipyard, Glasgow, by Panamanian owners. The yard has no engineering shop and the contract for the propelling machinery for the three vessels will go to local firms.

BRITISH ROAD SERVICES has placed a further order with Leyland Motors, Limited, for 24-ton gross Octopus trucks—a total of 125—to join some 600 already in service. Nearly 350 Leyland vehicles have now been ordered by BRS this year, including a fleet of Beaver and Comet tractors.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, has disposed of its holding of 834,697 shares in Westland Aircraft, Limited, Yeovil. The sale, it is stated, has taken place in accordance with the policy of AEI, which is not to hold permanently shares in companies outside its normal activities.

DAVID BROWN TRACTORS (ENGINEERING), LIMITED, Huddersfield, have produced a small cheap tractor which is their chief exhibit this year at the Smithfield Show. It is claimed that the machine is the first in the world to be fitted with a pneumatic system of implement control. All tools are underslung.

THE SOUTHAMPTON FIRM of Samuel Spencer, Limited, is reported to have bought the old shipyard at Trench Point at the entrance to Campbeltown loch. The deal was made with B.R.T. Securities, Limited, who have owned the shipyard site for the past 10 years. There is no information as to what use the yard is to be put.

THE FOUNDRY FIRM of J. Hobkirk, Sons & Company, Limited, Ampthill Road, Bedford, have added two new bays to their former non-ferrous foundry and this has now been converted into a foundry producing high-grade iron. In one of the new bays an oil-fired rotary furnace has been installed for the production of high-duty iron.

IN CONJUNCTION with seven other kindred bodies concerned with X-rays and their applications, the Royal Photographic Society is organizing an exhibition of X-ray photography from December 14 to 22, at 16, Princes Gate, S.W.7 (close to the Albert Hall) in commemoration of the discovery of X-rays by Professor W. C. Röntgen sixty years ago.

HEADQUARTERS for the new industrial tractor division of David Brown Tractors (Engineering), Limited, have been established at Feltham, Middlesex, where all home and export sales enquiries will be dealt with. A service and spares depot is also being established at Moll Spring Mills, Netherton, near Huddersfield. Mr. S. Hallam is the depot superintendent.

ABOUT 300 MEMBERS of the managerial and executive staff of Crofts Engineers (Holdings), Limited, Bradford, attended the sixth annual dinner of the company at the Midland Hotel, Bradford, on December 2. Mr. John A. Croft, deputy chairman, who deputized for his father, Sir Arthur Croft, at present in South America, said it had been a wonderful year for Crofts.

A SECOND ORDER from the Nova Scotia Light & Power Company has been placed with the English Electric Company, Limited, for a 45,000-kw, 3,600-r.p.m. steam turbo-alternator set, complete with feed heating and condensing plant, for installation at the Water Street power station in Halifax, Nova Scotia. The value of the order is approximately £450,000.

DISPLAYED in the entrance hall of the general offices of Newton Chambers & Company, Limited, at Thorncliffe, is the first ledger used by the company, which is entirely in the handwriting of George Newton, co-founder of the company. The first entry is March 2, 1793. Another exhibit is the purchase day book, showing all the material used by the company from 1822 to 1826.

A PAPER of distinct interest to manufacturers and users of gas-fired box-type furnaces was presented to the autumn meeting of the Institution of Gas Engineers. It was given by Mr. P. A. Cubbage and Dr. W. A. Simmonds. and carried the title "An Investigation of Explosion Reliefs for Industrial Drying Ovens. (1)—Reliefs in the Top of Box Ovens." A suitable design is put forward for the purpose of securing adequate pressure relief to comply with safe practice.

IN HIS ADDRESS to the Newcastle-under-Lyme Rotary Club, Mr. J. Carver, an inspector of the North Staffordshire District (Newcastle-under-Lyme) of the Mines Inspectorate, said that in 1306, although coal was burned only by artisans, so extensive was its use in London that Parliament complained to the King of the noxious vapours polluting the atmosphere. The result was that all but smiths were compelled to use other

News in Brief

fuel, lest the health of knights from the shires should suffer during their stay in London.

THE CAMPAIGN for domestic fuel-efficiency in Scotland is being stepped up by the Scottish committee of the CUC. They have formed two more joint service committees—Greenock and district and Stirling and district—bringing the total of such committees in Scotland to 10. The aim of the committees, which comprise local coal merchants and members of the CUC's panel of approved solid-fuel appliance distributors, will be to further the Coal Utilisation Council's policy of trying to secure the more efficient use of coal and other solid fuels in the home.

CONCERN about the shortage of alloy steels is expressed by Mr. Sidney Guy, chairman and managing director of Guy Motors, Limited, Wolverhampton, in a statement accompanying the firm's annual report. "We in common with others are very concerned with the shortage of alloy steels, the ever-increasing wage awards, the large increase in the cost of fuel, and their effect on the cost of supplies and production. The introduction of new plant and methods has resulted in some increases in productivity, but the increase compares unfavourably with some of the countries with whom British industry has to compete," Mr. Guy states.

DEMANDS for increased production in the motor industry have made it necessary to accelerate development by the Owen organization, Ald. A. G. B. Owen stated on December 2, at the sixth annual reunion and dinner of the organization's apprentice guild at Darlaston. He said that in the past 12 months the organization had exported well over £1 million worth of goods; they were doing even better this year and, basing the findings on figures so far, the group would have exported over £1,500.000 worth of goods by the end of the year. He added that in October alone, orders from Canada to the firm equalled the entire orders received in the previous 12 months.

BRITISH THOMSON-HOUSTON COMPANY, LIMITED, have awarded £60 to Mrs. Barbara Autherson, an employee at their works at Thorne, near Doncaster, for a suggestion which will boost production. This is the largest award given by the firm during the four years it has been at Thorne. For two and a half years Mrs. Autherson has taken 400 parts for fractional horse-power electric motors and spent considerable time in drilling holes in them to receive oil nipples, carrying them to a larger machine for another process. She submitted her idea of putting the drill close to the larger machine and drilling the oil-nipple holes while she was waiting for the previous part to be processed. The alteration has been made and she expects to be able to handle up to 100 more parts each day and the increased production will benefit both Mrs. Autherson and the firm.

Automatic Presentation Machine. Readers may well wonder just what is such a machine, just as the writer did before seeing the apparatus in operation at a Press conference. The machine is manufactured by Milford-Astor, Limited, Riverside Works, The Crescent, Salford, 5. It colour-prints show-cards, labels, tags, transfers, and the like on a wide range of materials. The transfers, when used on grinding wheels (and castings), it is suspected, should be given a coat of some sort of varnish. The output of this machine, which also cuts to shape, made a particularly attractive display of modern advertising art.

Fuel-economy Campaign

Mr. Geoffrey Lloyd, the Minister of Fuel and Power, has been suffering from a severe chill and was unable to attend two meetings in his programmed tour of the country's industrial centres to further the promotion of fuel efficiency in industry. Sir John Maud, Permanent Secretary to the Ministry, took his place in Leeds last Thursday, to address the Regional Boards for Industry for the East and West Ridings of Yorkshire. Mr. L. W. Joynson-Hicks, Parliamentary Secretary to the Ministry, who had previously held a meeting in Newcastle-upon-Tyne, deputized in Cardiff on November 29. On November 25, however, the Minister did address the North West Regional Board for Industry on the subject of fuel efficiency. At the meeting, held in Manchester, Mr. Lloyd gave an assurance that if cuts in coal supplies to industry had to be made, those companies which achieved economies in their consumption this winter would not have their allocations reduced. He added that essential supplies for the public services and the domestic consumers would be safeguarded by a planned reduction in supplies to industry.

New Gas Research Laboratories

Extensions to the Gas Council's London Research station at Fulham were officially opened on November 18 by Sir Robert Robinson, president of the British Association and a member of the Council's Research Committee. They add three more laboratories to the station and practically double the available floor area.

The additions bring the number of laboratories to seven. Of the new ones, No. 5 laboratory is the largest. Designed to accommodate big pilot plants, it covers 3,000 sq. ft. Work is already progressing on the life of refractory materials used in retorts and on the manufacture of catalyst for organic sulphur removal. In an adjoining block, No. 6 laboratory is arranged for smaller pilot plant experiments and houses apparatus used to investigate the biological oxidation of gasworks effluents.

The third of the new laboratories—No. 7—is the base of Fulham's mobile team of research workers, who cover the North Thames Gas Board's area to carry out on-the-spot tests on new or modified, full-scale installations.

Taxation Threat to Home Trade

Mr. A. S. Dick, managing director of the Standard Motor Company, speaking at the annual meeting in Coventry on November 30, said that the burden of taxation would be so great one day that the country's largest and most important exporting industry would be unable to sell its products at home. If this happened, exports would suffer also, and the effects on the nation's economy and employment would be far-reaching and tragic. He went on to say: "We are trying to counteract our constantly increasing costs by introducing new plant and equipment—we cannot afford to stay still if we are to go forward in selling in world markets, but we are in competition with large organizations with great capital resources at their disposal. We must have the most modern plant and equipment and we must also develop the domestic manufacture of a greater proportion of our products in the future."

PARKINSON & COWAN, LIMITED—Sir George Jessel will resign as chairman and from the board on December 31 in view of his other business commitments. He will be succeeded as chairman by Mr. H. P. Barker.

Mr. A. F. Tosh — Director of Summersons' Foundries Ltd.

Stands Firm for

BRITISH Quest MADE

Standard Bentonite

says that in every Foundry test Quest has proved the equal of American clays ***and it saves dollars***

Extract from a Paper read at the International Foundry Congress last June, commenting on Part II of the Paper by Middleton & White (see F.T.J., page 557, Nov. 17th.)

Bentonite "Life"

Mr. A. F. Tosh, director of Summersons' Foundries, Limited, wrote that he was much impressed by the mass of academic information and to a lesser extent by that of a practical type recorded by Middleton and White on the properties of bonding clays in part II of the Paper. During wartime, and to a lower degree since, British steelfounders relied mainly on home supplies and processing of bonding clays and it was a matter of personal regret, from a patriotic point of view, that this situation on the finding of these Authors was likely to change in favour of the American clay, even though mixtures exceeding 50 per cent. of the home-processed article were quoted as giving very good results. In support of the contention that there was more in the behaviour of a clay under actual foundry conditions than could be revealed by academic test or simulated "life" tests, recent experience of Summersons' Foundries are recorded in using Quest bentonite which is of Mediterranean (non-dollar) origin, but processed in this country :—

An extended trial of the home-processed bentonite from one supplier was made in the writer's foundry on the strict understanding that the full requirements could be met and there would be no deterioration in quality. All moulds were cast in green-sand in the firm's mechanized foundry, where a sand-reclamation plant was in use. When using Wyoming bentonite, the mixture was:—

Reclaimed sand	.. ..	80 per cent
New clay-bonded sand	..	10 per cent
New silica sand	.. ..	10 per cent

Each mixture was of 1,800 lb. and to each batch was added 12 lb. of bentonite, giving a green-compression strength of 7.5 to 8.5 lb. per sq. in. This mixture was continued with, but Quest was substituted for Wyoming bentonite, taking samples from each milling—this was in January, 1950. No immediate fall of green-strength was expected, owing to the amount of Wyoming bentonite already in the reclaimed sand but even after 3 months the green-strength figures remained the same, viz. 7.5 to 8.5 lb. per sq. in. The test was continued for a further 3 months and at the end of the total period no deterioration of sand properties was found. Since that time, supplies have been continuous and uniform and the quality of the foundry sand well maintained.

The experience related above is also shared by other foundries, among them being the David Brown Foundries Group, Ruston & Hornsby Ltd., Midland Motor Cylinder Co. Ltd., of the Birmid Group and Osborn Foundry & Engineering Co. Ltd.

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Personal

Mr. L. SMITH, formerly works manager of the Daimler Company, Limited, Coventry, has been appointed industrial relations officer.

Mr. J. O. HITCHCOCK, sales director of the Mond Nickel Company, Limited, was elected a member of the Institution of Mining and Metallurgy last month.

Mr. G. R. DAY, foundry manager of Barnards, Limited, Norwich, is joining the B.H. & C. Foundry Company of Compton, Berks, as director in January next.

Dr. C. E. KENNETH MEES, the well-known Kodak scientist, has retired from his position as vice-president in charge of research, after 43 years' service with the Eastman Kodak Company. He is succeeded by Dr. CYRIL J. STAUD.

Mr. JOSEPH RUSSELL, foundry manager of the NCB foundry department at Shotts, Lanarkshire, has retired. Mr. W. C. Parker, area general manager of the Board, on behalf of the management and workers, presented him with an oil painting.

Mr. G. W. ALEXANDER, Mr. W. MESSER, and Mr. G. W. DAVIDSON have been appointed directors of the Rhymney Engineering Company, Limited, which is owned jointly by Powell Duffryn, Limited, and International Combustion (Holdings), Limited.

Dr. HAROLD HARTLEY, C.B.E., chairman of Radiation, Limited, Stratford Place, London, W.1, will, at his own request, relinquish this office on December 31. His successor will be the present deputy chairman, Mr. W. DONALD KING. Dr. Hartley will retain his directorship of the company.

IT IS ANNOUNCED by Birlec, Limited, the furnace manufacturing company within the AEI group, that Mr. P. F. HANCOCK, research manager, Mr. A. E. PICKLES, manager of the induction heating division, and Mr. J. F. ROSS, works manager, have been appointed directors of the company.

Mr. J. A. HUNT, general manager of the Hymatic Engineering Company, Limited, and Mr. G. A. DURANT, supplies manager of the British Motor Corporation, and a local director of the Austin Motor Company, Limited, have been elected to the Council of the Birmingham Chamber of Commerce.

STEEL COMPANY OF WALES, LIMITED, announce the appointment of two assistant general managers in their steel division: Mr. R. W. EVANS (operations) and Mr. I. S. SCOTT-MAXWELL (engineering and development). Mr. Evans was formerly melting shops' superintendent, and Mr. I. S. Scott-Maxwell, chief engineer.

Mr. P. J. C. BOVILL, an assistant managing director of Newton Chambers & Company, Limited, has accepted an invitation to join the board of the Wellman Smith Owen Engineering Corporation, Limited. For a number of years there has been a close association between the two companies.

Mr. W. D. PUGH, managing director of the English Steel Corporation, Limited, has been appointed deputy chairman of the Darlington Forge, Limited, a subsidiary; Mr. W. S. Scott is made managing director, and Dr. C. J. Dadswell a director. Mr. W. E. A. Redfearn has been appointed assistant managing director of the English Steel Forge and Engineering Corporation, Limited.

Mr. JAMES ROBERTSON, who has completed 50 years' continuous service with Glenfield & Kennedy, Limited, Kilmarnock, was presented, last week, with gifts for himself and Mrs. Robertson from the male members of the drawing office staff. He already has the firm's long-service medal, and is only the third draughtsman in the long history of the firm to complete 50 years' continuous service in the drawing office.

Mr. F. W. SMITH is retiring on December 31, from the position of chairman and managing director of Dilworth & Carr, Limited, engineers and ironfounders, of Preston (subsidiary of United Glass Bottle Manufacturers, Limited). He will have completed 50 years' service with the company, 41 as managing director. Mr. Smith joined the Institute of British Foundrymen in 1932, attached to the Lancashire branch.

Mr. FRANK BROCKHOUSE, deputy chairman of J. Brockhouse & Company, Limited, West Bromwich, is retiring from the board of directors on account of age. He joined the company in 1888 and became a director in 1918, thus serving a total of 67 years, including 37 years on the board. He has seen the company grow from an organization employing 11 people to the present size—with eight branches and 30 subsidiaries.

Mr. J. GRAY BUCHANAN has been associated with William Jacks & Company, Limited, metal merchants and importers and exporters of plant and equipment, during most of their 75 years of trading. For some years past he has been chairman of directors; he joined the Glasgow office of the company in 1886, and became manager and partner of the business, now based in London, in 1901. He is one of the oldest members of the London Metal Exchange.

IN CONNECTION with the amalgamation of the Triplex Foundry Company, Limited, and the Great Bridge Foundry Company, Limited, Mr. W. H. L. HARRISON, managing director of the latter company, has agreed to join the board of Triplex in the capacity of chairman and managing director. Mr. J. W. and Mr. C. P. HORRELL will also act as managing directors. Mr. F. H. BENNETT will remain on the board, which is being further strengthened by the appointment of Mr. W. DOUGLAS CLARK of West Bromwich.

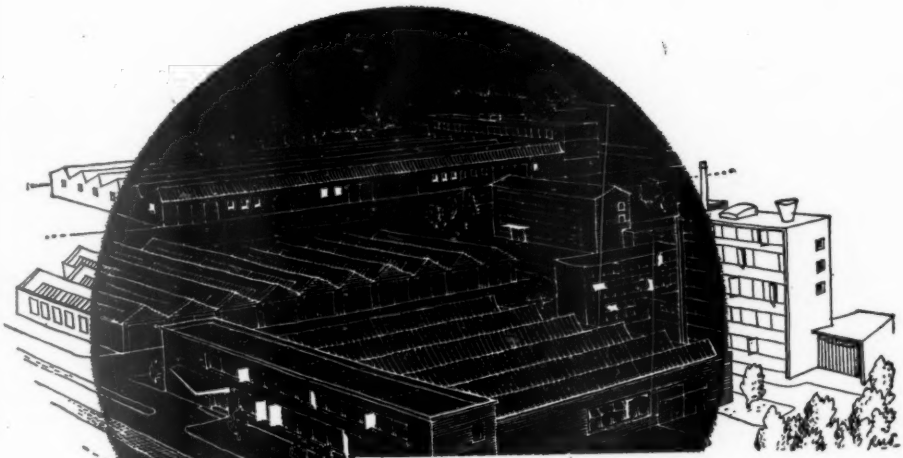
Obituary

Mr. J. S. A. WATKINSON, foundry manager at Wellworthy Piston Rings, Limited, Ringwood, for the past 11 years, died on November 26, at the age of 64 years.

Mr. G. C. TROWBRIDGE, a former managing director of Wickham, Limited, Coventry, has died aged 66. He joined Wickham's at Coventry in 1944, and became managing director in 1947, relinquishing the position last year owing to ill-health. He was a member of the Institute of Mechanical Engineers and of the Institution of Production Engineers.

SINCE 1952, Mr. Kenneth Gordon, who died on November 29, at the age of 57, had been Director-General of Ordnance Factories under the Ministry of Supply. He was a former joint managing director of the Billingham division of Imperial Chemical Industries, Limited, and deputy managing director of Head Wrightson Processes, Limited.

Mr. P. S. BAYLISS, a former managing director of Bayliss, Jones & Bayliss, Limited, Wolverhampton, has died at the age of 74. Mr. Bayliss—a grandson of one of the founders of the firm—joined the company more than 40 years ago. He became a director in 1921, joint managing director in 1927, and retired in 1948. He was also for four years a director of the British Rollmakers Corporation and Bayliss Rolls, Limited.



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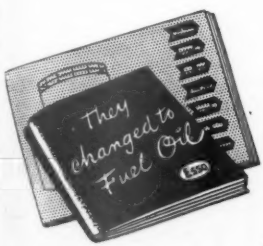

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Raw Material Markets

Iron and Steel

Continuing expansion of pig-iron production is an imperative need. Pig-iron makers have been building up their stocks of raw materials and should soon be able to bring additional capacity into operation. This should give an impetus to the performance of both the steel plants and the foundries, which have been using considerable tonnages of foreign pig-iron. The needs of the users of high-phosphorus iron have been overtaken, and specifications for this grade can be promptly covered, but there is still a dearth of low-phosphorus and medium-phosphorus iron and quite considerable tonnages of basic iron of Russian manufacture are being imported.

Shortage of labour rather than of material is now the chief worry of the re-rolling industry. There is no lack of orders. All the mills have substantial rolling programmes and bookings include many export sales at prices in excess of the maximum schedules fixed for the home market. Unfortunately, scarcity of manpower is beginning to limit outputs. On the other hand, difficulties in relation to supplies of most descriptions of steel semis have been overcome. Good supplies of home-produced billets, blooms, and slabs are coming forward and there are reasonable tonnages of foreign material in reserve.

As 1955 draws towards its close all the rolling mills are working under intensified pressure to increase their outputs. At best, the arrears in deliveries at the end of the year will be considerable, but some reduction is possible and the need is urgent. Reconciliation of the conflicting claims of home industries and the export trade presents a further difficulty. Increased shipments of finished steel are jealously regarded by British consumers, who in some instances have to rely on imported steel bought at enhanced prices. It is a confused situation which does not admit of speedy clarification. All the works have big commitments for the first half of next year and for the time being have suspended acceptance of new business.

Non-ferrous Metals

The continued rise in the price of tin this year has raised the value from a low point of £681 per ton to over £810 a ton this week. The unusually strong market for tin in London, Singapore, and New York reflects a mixture of the good demand expected over the coming months, the abnormally low stock position, and unsettled political conditions in the Middle and Far East, while absorption of tin by the United States stockpile authorities continues. Three months metal is at its highest level since April, 1953, having also topped the £800 mark.

Zinc has also been an active market in London and New York. On Whittington Avenue it has reached its highest point this year, approaching the £100 a ton level. The rise may have been less dramatic than that of tin, but the advance would appear to be no less solid. The call is strong for g.o.b. metal and demand outstrips available supplies of special high-grade material. The outlook for 1956 is bright and the market is looking for a further rise in the US price. In that case there is, perhaps, a growing speculative element in the demand.

In lead a high price is required on the London Metal Exchange to attract lead to this country, rather than lose it to the US, as has been happening recently.

Copper, although active, has been an uninteresting market. Threats of a strike in Chile on Sunday moved the price higher, but an indefinite postponement of the stoppage caused the market to ease. Demand is expanding in the States and consumers are tending to cover their first quarter's requirements. From the Rhodesian Copperbelt comes the news that the Northern Rhodesia Chamber of Mines has agreed to arbitration on the African Mineworkers' Union's demand for a basic wage increase of 6s. 8d. a shift.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* December 1, £384 to £385; December 2, £388 to £389; December 5, £386 to £387; December 6, £392 10s. to £393; December 7, £390 to £391.

Three Months: December 1, £374 to £375; December 2, £379 to £379 10s.; December 5, £375 to £376; December 6, £379 to £380; December 7, £379 to £380.

TIN, Standard—*Cash:* December 1, £788 to £789; December 2, £798 to £799; December 5, £805 to £806; December 6, £810 to £810 10s.; December 7, £809 to £810.

Three Months: December 1, £776 to £777; December 2, £782 to £783; December 5, £789 to £790; December 6, £799 to £801; December 7, £800 to £801.

LEAD—*First half December:* December 1, £109 15s. to £110; December 2, £110 5s. to £110 10s.; December 5, £110 10s. to £110 15s.; December 6, £110 15s. to £111 5s.; December 7, £111 5s. to £111 10s.

First half March: December 1, £109 5s. to £109 10s.; December 2, £109 10s. to £110; December 5, £110 to £110 5s.; December 6, £110 5s. to £110 10s.; December 7, £110 10s. to £110 15s.

ZINC—*First half December:* December 1, £95 to £95 10s.; December 2, £96 15s. to £97; December 5, £97 5s. to £97 15s.; December 6, £98 to £99; December 7, £98 15s. to £99.

First half March: December 1, £93 5s. to £93 10s.; December 2, £93 10s. to £93 15s.; December 5, £94 to £94 10s.; December 6, £94 10s. to £94 15s.; December 7, £94 15s. to £95.

CFA Supervisors' Course

The second of a number of short residential courses in foremanship sponsored by the Council of Ironfoundry Associations (14, Pall Mall, London, S.W.1) has been organized by their training officer, Mr. John Collett. It will be held at Tor Lodge, near Wolverhampton, from January 2 to 6. The programme covers the following subjects: "Structure of the Iron Industry"; "Foreman's Rôle in Industrial Relations"; "Foundry Safety and Good Housekeeping"; "Industrial Law"; "Work-study in the Foundry"; "Foundry Cost Control"; "Apprentice Training"; and "Human Aspects of Supervision"; it includes at least one outside visit. The fee for the course, including accommodation and all meals, is £8 8s., and applications to participate should be sent immediately to Mr. Collett at the address quoted above. (The first course was held most successfully at Tor Lodge, in September (*vide* JOURNAL, October 6, p. 395).)

Fire Detection. The Minerva Detector Company, Limited, Red Lion Street, Richmond, Surrey, have used a 12-page brochure to describe and illustrate a new system of fire detection based on nuclear physics. It operates through detecting the first trace of smoke from any smouldering material and only one piece of apparatus is needed for 1,000 sq. ft. of floor space. A claim is made that after an experience of over ten years no building protected by the Minerva system has ever been destroyed by fire. The brochure is available to readers on writing to Richmond.

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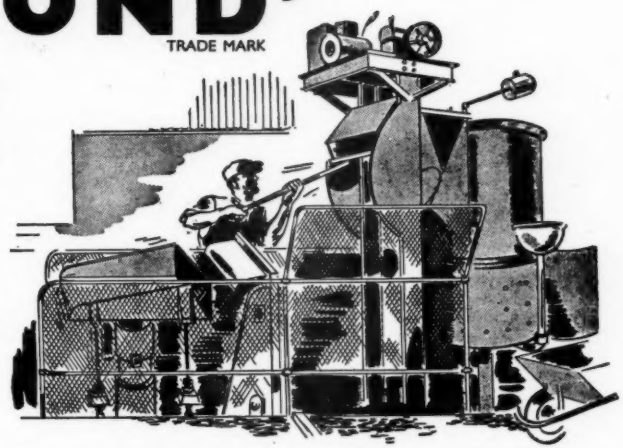

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

December 7, 1955

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £17 1s. 0d.; Birmingham, £16 13s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £18 12s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £19 8s. 3d.

Scotch Iron.—No. 3 foundry, £19 5s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £21 3s. 0d.; South Zone, £21 5s. 0d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £22 0s. 0d.; South Zone, £22 3s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent. :—N.-E. of England (local iron), £19 5s.; Scotland (Scotch iron), £19 11s. 6d.; Sheffield, £20 12s. 0d.; Birmingham, £20 19s. 6d.; Wales (Welsh iron), £19 11s. 6d.

Basic Pig-iron.—£16 16s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, nominal, scale 15s. per unit; 75 per cent. Si, nominal, scale 16s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 11s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £230 0s. 0d.; 38/40 per cent., £279 0s. 0d.

Ferro-tungsten.—80/85 per cent., 17s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 20s. 1d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent.C, £88 10s. 0d. to £95 0s. 0d., basis 60 per cent. Cr, scale 28s. 0d. to 32s. 0d. per unit; over 6 per cent. C, £87 10s. 0d. to £93 0s. 0d., basis 60 per cent. Cr, scale 28s. 0d. to 32s. 0d. per unit; 2 per cent. C* 2s. 1d. per lb. Cr.; 1 per cent. C,* 2s. 1½d. per lb. Cr; 0.15 per cent. C,* 2s. 2½d. per lb. Cr; 0.10 per cent. C,* 2s. 2¾d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 7s. 0d. to 7s. 6d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £249 0s. 0d.; 96/98 per cent., £269 0s. 0d.

Ferro-columbium.—60/75 per cent., Nb + Ta, 28s. per lb., Nb. + Ta.

Ferro-manganese (home).—78 per cent., £54 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £26 19s. 0d.; tested, 0.08 to 0.25 per cent. C, £27 19s. 0d.; hard (0.41 to 0.60 per cent. C), £29 5s. 6d.; silico-manganese, £37 12s. 6d.; free-cutting, £31 0s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £34 12s. 0d.; silico-manganese, £36 12s. 6d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £32 11s. 0d.; basic, hard, over 0.41 up to 0.60 per cent., C, £33 13s. 6d.; acid, up to 0.25 per cent. C, £36 12s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £33 1s. 6d.; boiler plates (N.-E. Coast), £35 11s. 6d.; floor plates (N.-E. Coast), £34 10s. 6d.; sectional material, N.-E. Coast, £30 19s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £34 7s. 0d.; flats, 5 in. wide and under, £34 7s. 0d.; hoop and strip, £35 1s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £36 5s. 0d.; black sheets (hand mill), 17/20 g., £46 13s. 6d.; galvanized corrugated sheets, 24 g., £58 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £58 0s. 3d.; nickel-chrome, £81 10s. 0d.; nickel-chrome-molybdenum, £92 7s. 6d.

NON-FERROUS METALS

Copper.—Cash, £390 0s. 0d. to £391 0s. 0d.; three months, £379 0s. 0d. to £380 0s. 0d.; settlement, £391 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 3s. 8½d. per lb.; rods, 434s. 3d. per cwt. basis; 20 s.w.g., 467s. 6d. per cwt.

Tin.—Cash, £809 0s. 0d. to £810 0s. 0d.; three months, £800 0s. 0d. to £801 0s. 0d.; settlement, £810 0s. 0d.

Lead (Refined Pig).—Second half November, £111 5s. 0d. to £111 10s. 0d.; second half February, £110 10s. 0d. to £110 15s. 0d.

Zinc.—Second half November, £98 15s. 0d. to £99 0s 0d.; second half February, £94 15s. 0d. to £95 0s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £129 0s. 0d.; rolled zinc (boiler plates), all English destinations, £126 15s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £109 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 11½d. per lb.; rods, drawn, 3s. 8½d.; sheets to 10 w.g., 368s. 9d. per cwt.; wire, 3s. 6½d.; rolled metal, 354s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £229; B6 (85/15), —; BS249, £238.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £285; HTB2 (38 tons), £290; HTB3 (48 tons), —.

Gunmetal.—RCH, 3/4 per cent. tin, —; BS1400, LG2 (85/5/5/5), £328; LG3 (86/7/5/2), £338; G1 (88/10/2/½), £403; (88/10/2/1), £399.

Phosphor Bronze.—BS1400, PB1 (AID released), £421 per ton.

Phosphor Bronze Strip, etc.—Strip, 514s. 0d. per cwt.; sheets to 10 w.g., 537s. 6d. per cwt.; wire, 5s. 3½d. per lb.; rods, 4s. 7½d.; tubes, 4s. 5½d.; chill cast bars: solids 4s. 7½d., cored 4s. 8½d. (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 5½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 10d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 9d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 4d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £89 10s. 0d. to £90 0s. 0d. Nickel, £519 0s. 0d. Aluminium, ingots, £171 0s. 0d.; aluminium bronze (BS1400), AB1, £372; AB2, £381. Solder, brazing, BS1845, 3s. 1d. lb. granulated, 3s. 4½d. lb.

FOUNDRY TRADE JOURNAL

EST. 1902

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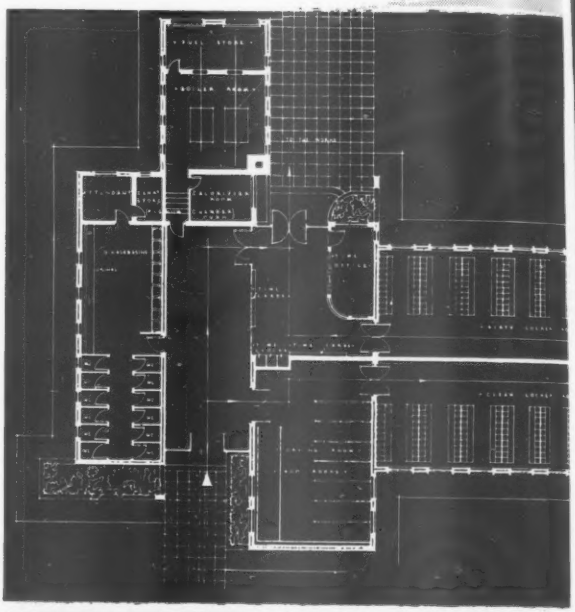

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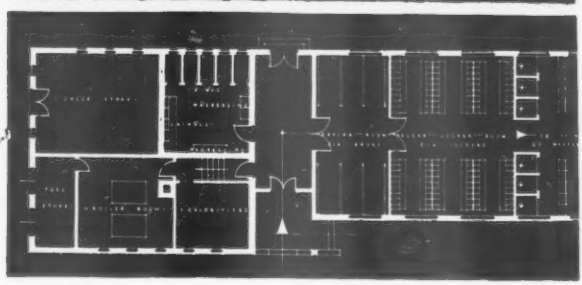

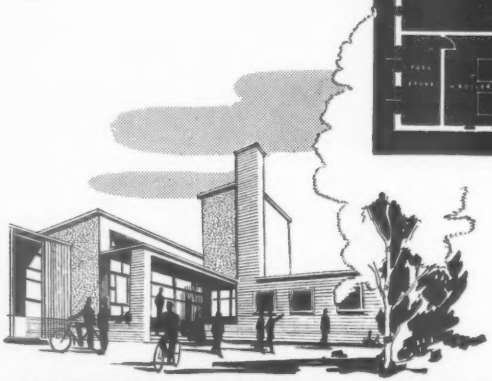

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Factory Report 1954*

It is a promising sign that in his Annual Report for 1954 Sir George Barnett, H.M. Chief Inspector of Factories, makes no special reference to the foundry industry. The number of foundry accidents reported for the year is 9,221, including 19 fatalities. Despite larger employment in the industry, this shows a 25 per cent. reduction since 1948, when the figure was 12,482. These figures contrast favourably with the overall figures for industry, where the number of accidents rose to 185,167 as compared with 181,637 in 1953, but the incidence rate was lower as there was overall increased employment. Sir George is still worried about the large number of accidents happening to young persons and has devoted a special chapter to this subject. Personal attention paid to new entrants to industry during their initiation will reap rich rewards through the reduction of much needless misery.

The case of industrial diseases shows some improvement in the incidence of pneumoconiosis amongst metal grinders (five reported) and "sandblasters" (four), but a deterioration amongst metal dressers (25). We have noted when visiting foundries, especially those making steel castings, that masks are being worn to an ever-increasing extent. It is pleasing to note that there were no reported cases of lead poisoning arising from the vitreous-enamelling process.

The Chief Inspector calls attention to the number of accidents arising from the use of portable electric tools and recommends that where possible the voltage used be reduced to 111 or 50. An interesting point brought out in the Report is that factories employing 100 or fewer produced only 23 per cent. of the accidents, whilst factories employing more than 100 (which comprised 5 per cent. of the total) were responsible for 77 per cent. of all accidents. For the first time, we note that noise is mentioned in the Report and the statement is made that: "anxiety had been felt . . . about the possibility of impairment of hearing"—*verb. sap.* Sir George's views on ventilation are worth recording. He says: "General ventilation is not a subject in which a great deal of progress can be reported in a year, perhaps because it is a subject about which so many people know so little and some, unfortunately, care less." While the lowering of the accident rate in the foundry industry is commendable, the industry still heads the list as reporting the highest number. Further improvement could and would be made if every foundry appointed an enlightened and enthusiastic leader to head a continuous campaign in the interests of accident prevention. By studying the Factory Report, such a person will have ample material for propaganda.

* Published by H.M. Stationery Office, York House, Kingsway, London W.C.2; price 8s. 3d. post free.

Council Departments' Dilemma

"I am staggered that there has been no consultation between the two departments," declared Councillor C. Willetts, chairman of the Halesowen Public Health Committee, criticizing the refusal of the Council's Highways and Planning Committee to permit Whitehouse & Sons (Halesowen), Limited, ironfounders, to carry out improvements at their foundry in Stourbridge Road, Halesowen.

The improvements which have been demanded by the Council's public health department and by the factory inspector, comprise canteens, kitchens, changing rooms, toilets, first-aid rooms and works offices, and have been refused on the grounds that the factory "is clearly an inappropriate industrial use in the area." The Council intend to develop this part of the borough, which already contains much residential property as well as shops and schools, for residential purposes only, and, says the committee, "this industrial undertaking must inevitably be a source of serious injury to the residential amenities; the development now proposed by the applicants is on such a scale that it would have the effect of further consolidating the industry on this site." Councillor Willetts, who asked for information on the matter from the chief sanitary inspector, said he was staggered to see that it had been completely refused.

The Mayor (Mr. A. Spring) said it was a question of establishing the business and making it more permanent. Mr. A. Archer, chief sanitary inspector, explained that from a public-health point of view it was an unfortunate decision. This department had been pressing the firm to improve the canteen facilities at the foundry and the factory inspector had also been pressing them over welfare matters there. Under new legislation the firm would become liable to provide these facilities as from January 1 next year.

Alderman L. Harper, chairman of the committee, said the Council had had a good deal of trouble with the firm. They had put in plans some time previously which the Council refused, and there was now an appeal, which the Ministry turned down. If the Council passed the application it gave the firm another loophole. "We would like to get them out, because it is in the midst of a residential area, and the proposed work would only add to the compensation the Council might have to pay when they finally moved.

Urgent Need

Councillor Willetts said that the foundry had been there a long while and was likely to be there for a good while yet. There were a lot of workers there, who had a very dirty job. No industry he knew had more need of every facility than a foundry. It might be that the factory would have to be moved eventually, but in the meantime had the workers to endure "these inhuman conditions"? Much as the Council might object to the foundry in Stourbridge Road, as long as it was there it was the Council's bounden duty to see that every possible facility was given to the workpeople. He moved the reference back of the minute.

Mr. A. H. Neale, seconding, stressed that a foundry needed changing rooms more than any other factory, and Mrs. E. Smith, supporting, said that a good deal of female labour was employed at the works now. The workpeople coming out of the factory looked like miners, but miners these days had adequate changing rooms and baths to use before they left to go home.

Alderman W. Parkes thought it was unfortunate that the public health department pressed for the facilities, yet as soon as the plans came before the Council they were turned down.

No Co-operation

The Deputy Mayor (Councillor G. A. Southall) was concerned about the "mix-up" that had occurred. Why had the Council not had the information about the public health and factory inspector's needs at the factory until that evening? It seemed there was no co-operation, and it had caused the Council to make a stupid decision in forcing the firm to do something not approved by another department.

Alderman H. J. Cox thought that haphazard improvement like this would not do away with the nuisance from this factory, which would not have been there if it had not been for the war. The best thing to do would be to cause the removal of the foundry by creating conditions that would make it impossible for the firm to carry on there, even if it cost the ratepayers money to help to remove it.

In reply to Mr. Southall, Mr. Archer said he had only been asked for the information on Tuesday morning. Whatever the Council felt about it, the new legislation said that the firm must provide the facilities.

Alderman F. L. Rose reiterated the explanation of the Planning Committee chairman. A previous appeal having been turned down, he said, it was wrong that anything which might consolidate this development should be permitted. He agreed about the workers at the foundry, but he thought that, having turned the matter down, there would be an appeal, and it would be better to let the Ministry make the decision.

Mr. Willetts said it was for the Council to make the decision. It was either right or wrong for the firm to provide the facilities. He declared that it was wrong to deny the workers the amenities which were commonplace in other factories of that kind. The firm had done everything that they had been asked to do and it was the Council's duty to permit this development.

The motion seeking reference back was carried.

Death of G. F. Mundell

The death is announced of Mr. G. F. Mundell, director of the Knowsley Cast Metal Company, Limited, Trafford Park, Manchester. He served his time as foundry apprentice with the firm—the "family" business—and took evening classes at the Manchester College of Technology. During the 1914 war, he served with the Manchester Regiment, and on return to civilian life, was made foundry manager and director. In 1946, he joined the Institute of British Foundrymen and in 1950 presided over the Association of Bronze and Brass Founders. He was Liveryman of the Worshipful Company of Founders and a prominent Freemason. His passing will be mourned by a wide circle of friends in the non-ferrous foundry industry.

Sir John Cass College Lecture Courses

Commencing in January, a new series of evening courses of lectures is to be held at the Sir John Cass College, Jewry Street, Aldgate, London, E.C.3. Among the subjects listed are the following: "Mass Spectrometer and its Applications," (eight lectures); "Practical Spectroscopy," (two); "Emission Spectroscopy," (10); "Patents and Industrial Design Protection," (eight); and "Microchemical Analysis," (10). The fee for each course is £1 and those wishing to attend should apply as soon as possible to the secretary at the address given above.

Ingates

Report of the Technical Sub-committee T.S.24 of the Institute of British Foundrymen presented at the London International Foundry Congress.

The sub-committee's work on gating systems summarizes the various factors affecting flow through the channels carrying the metal to the casting. The initial experiments and an exhaustive study of the literature convinced the sub-committee that molten metal at pouring temperatures behaves like a normal fluid and that, therefore, the laws of hydraulics could be applied. From these laws, equations have been derived relating the rate of flow to the shape and size of the gating system. Hydraulic loss-cofficients for use in these equations were determined by practical experiments on the foundry floor for the normal components of gating systems and a method is described for determining further loss-cofficients for other components. The validity of the equations and coefficients was established by numerous tests on small and medium-size castings.

The Report does not lay down any empirical rules for gating but rather provides basic information so that once the foundryman has decided what he requires of the gating system, i.e., the number and position of ingates, the mould filling time, the speed of entry at the ingates and whether it is to be pressurized or non-pressurized, the information and equations given in the Report will enable the total ingate size and the dimensions of the remainder of the gating channels to be determined. The gating system can then be expected to give maximum yield, whilst still meeting the conditions imposed.

CONSTITUTION OF THE SUB-COMMITTEE

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F. Butters
D. Carrick
F. Cousans, F.I.M.
B. Edwards, G.I.Mech.E.
G. Foster
G. L. Harbach
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D. Killingworth, B.Sc., F.I.M.
G. Martin, B.Sc., Ph.D., A.M.Mech.E.
D. W. Spence
G. L. Turner, B.Sc.
G. Lambert, Secretary

Others who have served for periods during the long life of the Committee are W. Barnes (the original Chairman), R. C. Shepherd, who was Chairman for several years, D. W. Berridge, A. I. Donaldson, F. J. Hoult, H. W. Keeble, A. B. Lloyd, B.A., K. H. Wright and D. Worth, B.Sc.

Terms of Reference

This sub-committee was formed in December, 1947, with the following terms of reference :—

"To study the influence of the shape and size of ingate and runner systems on the condition of flow of metal into a mould."

For the purpose of the sub-committee's work, the condition of flow was defined as the rate of flow through a gating system as a function of its dimensions and shape. The sub-committee was asked in particular to investigate the effect of shape and size of gating systems on the speed of flow, disregarding such factors as turbulence, cleanliness, soundness, sinking, etc., of the casting. Experiments were to be conducted to establish fundamental data regarding the time of filling a mould rather than information on any gating method of metal for the purpose of obtaining a good casting. The investigations carried out, therefore, dealt principally with the rate of flow through gating systems, turbulence within the system being only briefly considered. The terminology of gating terms has been standardized in the report as shown in Fig. 1.

RATE OF FLOW OF METAL IN A GATING SYSTEM

Introduction

Once the assumption is made that poured metal behaves like a liquid, the laws of hydraulics can be applied to a gating system. This has been suggested by several previous investigators, such as Dietert,[1, 2] Petin,[3, 4] Henon,[5] Osann,[6] Frede,[7] Lehmann,[8] Benkoe,[9] Lips,[10] and Lips and Nipper.[11] All these investigators, however, either at some point of their treatment of the subject leave hydraulic theory altogether and continue with purely empirical relations (which are applicable to specific gating systems or metals only) or they merely state the basic laws of hydraulics without giving any experimental evidence of the applicability of these laws to the gating problem. The earliest investigation of casting speed along hydraulic principles was carried out by Miaskowski,[12] whose work does not seem to have gained the recognition it deserves. Miaskowski considered top gating only, and found good agreement between theoretical predictions and the actual casting times observed for cast-iron and aluminium

Company News

RANSOMES & RAPIER, LIMITED—Stockholders have approved the reconversion of the existing preference and ordinary stock into shares.

UNIVERSAL GRINDING WHEEL COMPANY, LIMITED—The directors propose to capitalize £45,165 by paying up 180,660 ordinary shares of 5s. each, to be distributed to ordinary stockholders registered on June 15 in the proportion of one for 10.

J. STONE & COMPANY (HOLDINGS), LIMITED—A final dividend of 12 per cent. is recommended, making 16 per cent., less tax, for 1954, on the £2,058,514 ordinary and "A" ordinary capital as increased by a 50 per cent. scrip issue. This is an effective increase of 2¾ per cent. over the previous year's total of 20 per cent. on the former capital.

GEO. SALTER & COMPANY, LIMITED, makers of springs, weighing machines, etc., of West Bromwich—The company is raising its ordinary dividend by 2½ per cent. to 10 per cent., less tax, from group net profits more than doubled at £85,955, compared with £40,099 in the previous year, subject to audit, in respect of the year ended March 31.

SAUNDERS VALVE COMPANY, LIMITED—The board recommends a final dividend of 14 per cent., which, with the interim of 6 per cent. paid in March, makes a total distribution of 20 per cent. for the year to April 30, 1955. The final and total amounts, which are as last year, are as forecast in March when a rights issue (made in April) was proposed of 200,000 shares of 5s.

GILLETTE INDUSTRIES, LIMITED—Record profits and dividends are reported for the year to November 30 last by the company, which is the UK subsidiary of the Gillette Company of Boston, Mass. Group accounts show consolidated trading profits just over £1,000,000 higher, at £5,633,870. Net profit comes out at £2,577,765, compared with £1,664,759. Dividends paid by the group total £2,606,083, against £1,667,750.

BILSTON FOUNDRIES, LIMITED—The chairman (Mr. H. C. Sargent) reports that the company's turnover for the year to March 31 constituted a record. The company has a full order-book and turnover so far this financial year has substantially exceeded that of the corresponding period last year. The directors are to offer 700,000 ordinary shares of 2s. each in the proportion of one new ordinary share for every three ordinary shares previously held at 4s. 6d. per share.

FALK, STADELMANN & COMPANY, LIMITED, makers of lighting, heating, and cooking appliances, of London, E.C.1—Although the directors have declared an interim of 7½ per cent. less tax for the year to March 31, 1955, compared with 10 per cent. last year, they are able to inform shareholders that the total distribution will not be less than the 15 per cent. for the previous year. In order to space the payment of the ordinary dividends more evenly in time and amount, the board has decided to pay the interim earlier than usual, on this occasion June 28.

THE OFFER by Leyland Motors, Limited, for the ordinary and preference stock of Scammell Lorries, Limited, which closed on June 15, has been found acceptable by the holders of the requisite amounts of each class of stock. The chairman of Leyland Motors announces that Scammell Lorries, as in the previous case when Albion Motors, Limited, was acquired in 1951, will be operated as a wholly owned subsidiary under a separate board, with Mr. W. E. Pearson continuing as managing director.

May Steel Output Highest Ever

Production of steel in May averaged 401,600 tons a week and was at the highest rate achieved in any month. In May, 1954, output averaged 374,500 tons a week. The previous record month's output level was in March, when production was at a weekly average of 394,900 tons.

Pig-iron production averaged 241,800 tons a week in May, compared with 231,400 tons a week in the corresponding month of last year.

Prospects of both steel and pig-iron output for the current month are, of course, seriously affected by the rail strike. It is not yet possible to assess the full effect of the strike on production, but it is certain that the month's output will be well below the May level.

Latest steel and pig-iron output figures compare as follow with earlier returns:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
	Tons.	Tons.	Tons.	Tons.
1955—January ..	236,400	12,292,000	380,600	19,789,000
February ..	241,700	12,567,000	394,200	20,498,000
March ..	240,700	12,516,000	394,900	20,536,000
1st qtr. ..	239,700	12,463,000	390,300	20,295,000
April ..	238,500	12,401,000	393,300	20,454,000
May ..	241,800	12,574,000	401,600	20,884,000
1954—January ..	229,600	11,941,000	360,300	18,737,000
February ..	222,300	11,557,000	357,300	18,577,000
March ..	230,900	12,007,000	364,800	18,969,000
1st qtr. ..	227,900	11,848,000	361,100	18,777,000
April ..	232,100	12,069,000	368,300	19,155,000
May ..	231,400	12,033,000	374,500	19,476,000

Increases in Capital

VACU-BLAST, LIMITED; engineers, founders, etc., of London: E.C.4, increased by £10,000, in £1 shares, beyond the registered capital of £15,000.

DAVID ADAMS & SONS, LIMITED, ironfounders, etc., of Cradley Heath (Staffs), increased by £21,000, in £1 preference shares, beyond the registered capital of £4,000.

O. J. WOOTTON, LIMITED, brass and aluminium founders, etc., of Wolverhampton, increased by £47,000, in £1 ordinary shares, beyond the registered capital of £3,000.

GIBBONS (DUDLEY), LIMITED, manufacturers of gas retorts, etc., of Dudley (Worcs), increased by £400,000, in £1 ordinary shares, beyond the registered capital of £250,000.

HILL & SON (MANCHESTER), LIMITED, ironfounders, engineers, etc., of Miles Platting, Manchester, increased by £47,000, in £1 ordinary shares, beyond the registered capital of £3,000.

WHESSOE, LIMITED, plant engineers, etc., of Darlington, increased by £500,000, in 1,600,000 ordinary and 400,000 unclassified shares of 5s. each, beyond the registered capital of £1,000,000.

JOHN INGHAM & SONS, LIMITED, iron and steel merchants, etc., of Ossett (Yorks), increased by £45,000, in £1 "A" ordinary shares, beyond the registered reduced capital of £105,000.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade, Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

IRAQ, July 2—Water meters, for the Directorate-General of Municipalities, Bagdad. (ESB/12721/55.)

KOREA, October 31—Materials and equipment for limestone crushing plant, for the Korea Industry Developing Company, Seoul. (ESB/12345/55.)

SOUTH AFRICA, July 5—Bench grinder, for the Stores Department of the South African Railways. (ESB/12194/55.)

Council of Ironfoundry Associations

Annual Report on 1954 *Activities*

The Report of the Council of Ironfoundry Associations, for 1954, which was presented at the thirteenth annual meeting of the Council in London earlier this year has now been made available. Extracts are reproduced in what follows. Complete copies of the Report are available to readers on writing to the CFA at 14, Pall Mall, London, S.W.1.

Through the Joint Iron Council, the executive committee of the Council of Ironfoundry Associations was consulted by the Iron and Steel Board on matters intimately linked with future development. It played an important part in the discussion with the Ministry of Labour of problems arising from the Iron and Steel Foundries Regulations, 1953. In the field of training, the committee took an active interest in the work to be financed from the grant from Conditional Aid funds. With the mounting production of iron castings, close attention was again given to the supply of scrap for ironfounding. The committee gave public expression to the industry's anxiety over the continued rise in the price of coal (and the inevitable effects on the cost of materials and services depending on it). In these and in the many other spheres in which it acted or kept watch on behalf of the industry, the executive committee had the advice and support of the Council.

Iron and Steel Board

The chairman and several members of the executive committee have taken part in the discussions which are now held at regular intervals between the Joint Iron Council and the permanent members of the Iron and Steel Board. In the early part of the year, these discussions were much concerned with finance—on the one hand the industry's contribution to the income required by the Board, and on the other the provision of funds for research. Later in the year, in connection with a survey of the ironfounding industry, the Board asked to be supplied with a forecast of the long-term demand for iron castings; an estimate of output up to 1960 was approved by the committee and by the Council before it was submitted to the Board. The Board has now published a report on the development of the iron and steel industry in the period 1953-58, in which it refers to the requirements of the ironfounding industry, assuming an output of 4,000,000 tons of iron castings in 1958. The information was needed by the Board in connection with its responsibilities to ensure an adequate supply of raw materials for the industry. The Board and the JIC have given special consideration to the future demand for low-phosphorus pig-iron; this subject is mentioned in the Board's report.

Joint Iron Council

The executive records with pleasure that the chairman of the Council of Ironfoundry Associations, Mr. N. P. Newman, was elected to the presidency of the Joint Iron Council in October in succession to Sir Frederick Scopes, who had held the office with distinction for several years. The executive committee of the JIC is composed of an equal number of representatives of the CFA and of the Council of Iron Producers, and it is thus well constituted to deal with matters of common interest to both producers and consumers of pig-iron.

The tenth annual report of the JIC, which summarized its activities over the 12 months ended June 30, 1954, was sent to all member-firms in October, and was discussed at the JIC Convention in London on November 2, 1954. Ironfounding matters which received special attention at the business meeting included the anticipated expansion of output in the next six years, coupled with the supply of skilled and unskilled labour; the acute anxiety felt about the rising cost of coal and coke; and failure of workpeople to comply with the Iron and Steel Foundries Regulation which requires them to wear the eye protection devices provided by the employers for specified operations. At the evening banquet there was a gathering of approximately 500; many distinguished persons in political and industrial circles were present, and the principal guest was Lord Layton, chairman of the Consultative Assembly of the Council of Europe, whose earlier connection with the iron and steel industry as the first director of the National Federation of Iron and Steel Manufacturers is well remembered.

The JIC has been responsible, for several years, for the provision of funds for research, education and similar development work. The CFA has itself benefited to a considerable extent by grants from this source. The calls on these funds had caused anxiety for several months, and the nature of the problem was fully described in a letter sent to member-firms in August, 1954. The executive committee is gratified to learn that the problem has to a very large extent been overcome through the continuation of the pig-iron levy and it wishes to record its appreciation of the policy followed by the Council of Iron Producers in a matter which bears so vitally on the development of the ironfounding industry.

Output

After the recession, which had its main effect on the 1953 output figures, total output in 1954 amounted to 3,742,492 tons and thus nearly regained the record levels achieved in 1951 and 1952. The overall level of activity was fairly steady for most of the year, but there was a considerable expansion during the last quarter. The automobile section had the biggest output expansion over 1953 and there were smaller increases for pipes, engineering, and building and domestic castings. There was a slight fall in the output of ingot moulds and railway castings compared with 1953.

Table I shows how the total output of iron castings was made up in each quarter of 1954. The relative upward trend for automobile and malleable castings, and a downward movement for railway castings, were the most notable movements during the year.

Percentage Composition of Iron Castings Production During 1954.

—	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Automobile (including tractor)	11.5	11.9	12.9	12.8
Engineering and jobbing ..	35.3	36.3	36.1	36.0
Building and domestic ..	15.0	14.9	15.1	15.5
Pipes	19.5	18.9	18.6	18.8
Ingot moulds	9.8	9.3	9.2	9.3
Railway equipment	8.9	8.7	8.1	7.6
Total	100.0	100.0	100.0	100.6
Malleable iron (as a percentage of total)	3.6	3.7	3.9	4.1

Council of Ironfoundry Associations

Raw Materials

Pig-iron

The executive has reviewed the pig-iron supply position at each of its monthly meetings. Although there were some difficulties in obtaining adequate supplies of particular grades, no serious shortages of pig-iron were experienced. Shortages of low-phosphorus and low-silicon and manganese hematite pig-irons were referred to the Joint Iron Council for consideration. The supply of low-phosphorus foundry pig-iron has continued to receive the close attention of the committee. Maximum price determinations for foundry pig-iron were made by the Iron and Steel Board in March and May, 1954. The amount of pig-iron charged by ironfoundries in 1954 was 2,356,925 tons (compared with 2,336,890 tons in 1953), and receipts amounted to 2,356,145 tons (compared with 2,395,264 tons in 1953). Stocks at foundries at the year end were at a level of 5.6 weeks' consumption.

Iron and Steel Scrap

The Council was consulted by the Ministry of Supply and the Iron and Steel Board when the Ministry was in course of revising the Iron and Steel Scrap Order, 1952. A new Order (S.I.1954/1953) was published on December 1, 1954. A proposal had been made that the better grades of steel scrap for use in steel works should be increased in price. The Council protested against such price increases since they would entail corresponding increases to foundries in order to maintain their supplies. Proposals to increase the prices of cast-iron scrap were also resisted by the Council, and, as a result, the increases were kept to the minimum necessary to maintain the flow to ironfoundries. The differential between the top and bottom grades was widened, and the scrap trade has undertaken to exercise more care in selection.

While the Control Order was being revised, the committee considered that it was desirable to register the opposition of the CFA to the removal of price control, on the grounds that removal would not materially increase the quantity of scrap available but would probably lead to a heavy increase in ironfounders' costs. Both the Ministry and the Iron and Steel Board appreciated the considerations put before them, and it seems likely that control will be maintained for a long time to come.

The executive was concerned about the supply difficulties which existed in certain areas and which became acute towards the end of the year. Action was taken by the Ministry of Supply to improve the situation in the West Midlands.

The bought receipts of scrap iron and steel by ironfoundries in 1954 amounted to 1,198,575 tons (compared with 1,099,096 tons in 1953). Of this increase of 99,479 tons, 59,938 tons were accounted for by steel scrap. The total amount of scrap charged (including "own arisings") was 2,962,752 tons, against the 1953 figure of 2,786,414 tons. The proportion of scrap in the total metal charge rose from 54.4 per cent. in 1953 to 55.7 per cent. in 1954. The upward trend in the scrap ratio occurred during the first half of the year, but was not fully maintained in the later months. Stocks at ironfoundries at the beginning of the year were 190,287 tons and at the end of the year 194,358 tons, equivalent to about 6.7 weeks' consumption.

Coke

Representatives of the Council met the British Coking Industry Association in September to discuss matters connected with the quality, price and supplies of foundry coke. There was a frank exchange of views, in which the ironfounding representatives expressed concern over a deterioration in the quality of certain grades. The vexed question of retrospective price increases was mentioned; a spokesman of the British Coking Industry Association gave an assurance that any future increases would not be given effect retrospectively. The need to stabilize prices was emphasized at the meeting and, although this did not prevent a further increase in prices in December, the British Coking Industry Association gave an assurance that it would not seek any further increase for a period of twelve months, save in the event of a rise in the price of coal or working costs.

The future coke requirements of the ironfounding industry were outlined at the meeting, and the executive has subsequently informed the coke producers of the anticipated iron castings output in 1960. The British Coking Industry Association has accepted this forecast and expects to be able to fulfil the demands of the ironfounding industry. Foundry coke supplies in 1954 were generally adequate. The total consumption of coke of all qualities (except breeze) was 1,005,000 tons.

Ferro-alloys

The committee has reported to the Ministry of Supply and the Board of Trade the difficulties which member-firms have experienced because of the world shortage of nickel. The current scarcity is caused by the American Government's decision to stockpile the metal for strategic reasons and the greatly increased demand in this country. There are no longer restrictions on its use and industrial consumers would not welcome a return of Government control. In order to ensure that the ironfounders' interests were not overlooked, the committee aranged for the position to be discussed with one of the principal producers which is operating an unofficial allocation scheme. It appears that supplies in 1955 will be insufficient to meet all demands. The central purchasing scheme for ferro-silicon came to an end in June, 1954. Supplies generally have been adequate and no difficulties have been reported.

Statistics

Census of Production

Despite the objections of the Council, and many other industrial organizations, the committee set up to advise the President of the Board of Trade has reported in favour of continuing the Censuses of Production, though recommending some lightening of the burden in detail. The Government has accepted the committee's findings. The executive intends to take suitable steps to ensure that the ironfounding industry benefits from the concessions recommended. In the 1954 Census, arrangements for which were determined before the committee had reported, the Council obtained the agreement of the Board of Trade to a reduction in the number of output headings, and to alterations of the remaining headings to bring them more into line with the Iron and Steel Board's form C.90.

Revision of Forms

Through the Joint Iron Council, the CFA was consulted about the Iron and Steel Board's plans for revising the statistical returns which it requires from ironfoundries. Many detailed improvements have been agreed and the net burden on firms has been appreciably lightened; at the same time, continuity with previous statistics has largely been preserved.

Health and Safety in Ironfoundries

The burden of employers' liability and the growing number of claims at Common Law have been noted with grave concern by the executive, which considers

that this aspect should not be ignored in considering the humanitarian background to accident prevention. Close collaboration with the leading employers' insurance companies has been continued, and various law cases have been closely studied. Public attention has been sharply focused on questions of health and safety in industry through the prominence given in Parliament and the Press to the annual reports of HM Chief Inspector of Factories in recent years. Several questions asked in the House of Commons have sought to establish the need for improvements in the organization of accident prevention work in factories. The executive regards the work of the Safety Committee as of great importance to the ironfounding employer.

Safety Committee

The committee has drafted a code of safe working practices intended for use in ironfoundries, and it is at present consulting other employers' organizations having foundry interests about the contents of the code.

Difficulties have been reported to the executive about the neglect of eye protection in ironfoundries. From an inquiry which has been made, it is clear that more co-operation from employees is needed in making full use of the eye protection which employers are statutorily required to provide.

The Safety Conference organized by the committee in March, 1954, was attended by about 120 representatives of member-firms. The proceedings opened with a recorded message from the Parliamentary Secretary to the Ministry of Labour and National Service, and HM Chief Inspector of Factories (Sir George Barnett) gave an address on the Iron and Steel Foundries Regulations, 1953..

Iron and Steel Foundries Regulations, 1953

Last year saw the introduction of the Iron and Steel Foundries Regulations, 1953, but it is too early to assess their full effect, especially as two important regulations—on ventilation and on baths—do not come into force until January 1, 1956. Several problems resulting from the introduction of the regulations have arisen in the course of the year. These have been considered by the *ad hoc* committee originally set up to deal with the draft regulations, and there has been close collaboration with the other foundry employers' organizations.

"Years of Endeavour"

Ill-considered comments on working conditions in the ironfounding industry have been common in recent years. The industry's accident rate has been the subject of questions in the House of Commons, and a lack of progress has been alleged in many quarters. The executive considered that the public impression of the industry ought not to be derived from ill-informed criticisms. As member-firms will know, considerable progress has been made, and large sums of money have been spent in improving the working conditions and amenities in foundries. Accordingly the executive undertook the publication of a booklet, "Years of Endeavour," which set out to refute criticism of the industry, by demonstrating the achievements of voluntary effort between 1947 and 1954. The booklet was given a cordial reception: several hundreds of copies were distributed in political, industrial and official circles, and it was widely mentioned in the daily Press as well as in trade and technical journals.

End of Building Licensing

Building licensing, which was for so many years a major obstacle in the way of ironfounders who wished to carry out structural alterations for the improvement of working conditions and amenities in accordance with the recomendations of the Garrett Report, was brought to an end in November.

Air Pollution

Through the JIC, the Council is represented on the air pollution panel of the Federation of British Industries by Dr. J. G. Pearce. In the early part of the year the executive was asked to consider the evidence intended for submission to the Beaver Committee on air pollution by the Federation. The FBI panel recommended that metallurgical works which present special difficulties of air pollution should be supervised by the Alkali Inspectorate of the Ministry of Housing and Local Government (rather than by local authorities). This recommendation was accepted by the Beaver Committee, and is contained in its final report, published in December, 1954. The Government has accepted the recommendations of the committee and has announced that a Bill to implement them will be introduced this session.

Transport

As a result of the provisions of the Transport Act, 1953, a scheme for the reorganization of the railways was published as a White Paper (Cmd. 9191) in July 1954. Details of the scheme were summarized in the CFA *General Bulletin.* The British Transport Commission has now drafted proposals for a new charges scheme for merchandise traffic. The draft charges scheme has been considered by the CFA Transport Committee, and it has been the subject of discussions between the Traders' Co-ordinating Committee on Transport (of which the CFA is a member) and the British Transport Commission. It is expected that objections to the scheme will be made when it is laid before the Transport Tribunal, and the executive expects to be asked to support such objections, particularly as they may affect the bulk carriage of heavy raw materials.

Rail-freight, dock and canal charges were increased by 10 per cent. from March 1, 1954. The executive supported the action of the Traders' Co-ordinating Committee on Transport in protesting to the Minister of Transport before he authorized the increase; the committee expressed concern that the increase was to be borne by trade and industry alone, and questioned whether an increase of even 5 per cent. was justified. The Council has supported the British Iron and Steel Federation in urging upon the Minister of Transport the need for increased capital expenditure on railway modernization.

Recruitment, Training and Education

In the Report for 1953, the executive committee stated that the Government had made a grant from Conditional Aid funds for the promotion of training in the ironfounding industry. The Recruitment, Training and Education Committee is responsible for advising the Council in this branch of its work, and it has given much attention to the present facilities for training, as well as to the allied subject of recruitment. Much of its work last year was necessarily exploratory. The committee is considering various proposals for a national training scheme for young craftsmen, recognizing the importance attached to such schemes by the Youth Employment Service, which now plays an ever-growing part in the placing of young persons in industry. The committee has arranged for an experimental course for foundry supervisors to be held at the National Foundry College in April, 1955; it hopes to produce from the course a model syllabus suitable for use in the technical colleges. A survey has been made of the training schemes and policies of almost 100 ironfounding companies. The committee's aim is to ensure that existing facilities for the training of all

grades of foundry personnel are used to the full, and it hopes that local interest in recruitment and training work will be stimulated through the Associations.

National Foundry College

The National Foundry College has successfully completed its seventh session, in the new buildings adjoining the Wolverhampton and Staffordshire Technical College. Of the 41 students who attended in the 1953-54 session, 21 in the Part I course qualified for the Part II course beginning later in the year. The 1954-55 session began in September with 36 students; the increased demand for places has made it possible for the Governors to appoint a selection committee to interview applicants seeking admission to the course. The premises were officially opened by the Permanent Secretary of the Ministry of Education on February 3, 1954. The Joint Iron Council continues to make a substantial annual grant to the College, and made a special grant towards the cost of equipping the new buildings.

National Foundry Craft Training Centre

The Craft Training Centre at West Bromwich has again had a busy year, receiving 107 boys for instruction from many parts of the country. In the six years of its existence, the Centre has given training to nearly 300 students, many of whom have returned to the Centre for the more advanced courses of instruction. Sixty-five boys have successfully completed the full four courses and each has been awarded a certificate by the trustees. A textbook on "Ironmoulding for Apprentices," written by the Centre's instructor, will be published early in 1955.

Teaching Aids

Throughout the year member-firms have made good use of the visual training aids—films, film strips and wall charts—supplied by the CFA. Several films on foundry subjects which had been made for the European Productivity Agency have been viewed and recommended for use in this country.

Costing

Widespread interest has been shown by member-firms in the articles entitled "Elements of Foundry Costing," which are distributed at frequent intervals. Nine instalments have been issued, and the series will be completed in 1955. The articles have stimulated much interest in costing methods. Many firms have been supplied with extra copies of the articles for their accounting staff. In addition there has been a renewed demand for copies of the CFA's standard work "Cost Ascertainment Methods for the Ironfounding Industry based on Uniform Principles."

Affiliated Technical Organizations

British Cast Iron Research Association

There has been valuable collaboration between the CFA and the technical staff of the British Cast Iron Research Association. In February the CFA joined with the Association in conducting the second conference on "Simplifying Foundry Operation." The Association's operational research team has continued its advisory work; since 1950 to the end of 1954 the team has made 580 visits to foundries. The Foundry Atmospheres Committee has been engaged on experimental work on problems connected with the control of dust during knocking-out operations. The effect of thermal currents and cross draughts on the dispersal of dust into the general foundry atmosphere has been investigated and the limits of air velocity required to control dust movement have been established. Work on grinders has continued, with particular reference to hand grinders. The application of a water spray to de-coring has been successfully developed.

The Association decided to hold a conference on "Ventilation and Dust Control in Foundries" in April, 1955. This will give members the opportunity to hear what progress has been made towards solving problems in the adequate ventilation of ironfoundries, which becomes a statutory requirement from January, 1956, under regulation 7 of the Iron and Steel Foundries Regulations. The Association has been able to extend its advisory services through assistance from Conditional Aid funds.

Institute of British Foundrymen

With the aid of a grant from the Joint Iron Council the Technical Council of the Institute of British Foundrymen has completed an exceptional year's work in the field of technical research, in that five committees have completed their work during the twelve months. Of the reports of these sub-committees two will be presented at the International Fouhdry Congress to be held in London in 1955, two will form contributions to an "Atlas of Typical Microstructures of Cast Metals" which the Institute hopes to publish during the coming year, and the fifth, pending decisions yet to be taken, has provided the basis for views put forward for the revision of the British Standard for grey cast iron. In addition, the Joint Committee on Gases in Cast Iron and the Joint Sands Committee have prepared reports during the year. One new sub-committee (on which the CFA is represented), has been formed to study the design of castings.

On behalf of the CFA, the Institute has adjudicated the Student's Grant, which was awarded to Mr. J. Crossley, now a student at the National Foundry College. A conspicuously successful Foundry Foremen's Training Course, in which 185 foremen participated, was held at Ashorne Hill in April.

Relations with Other Associations

The Council has collaborated with the Engineering and Allied Employers' National Federation, the National Light Castings Ironfounders' Federation, the British Steel Founders' Association, and the Association of Bronze and Brass Founders. With the first three bodies, it has given much attention to problems arising from the introduction of the Iron and Steel Foundries Regulations. In broader matters affecting industry generally, notably in connection with atmospheric pollution, the Census of Production, and taxation, the Council has collaborated with the Federation of British Industries and the National Union of Manufacturers.

Information and Press

The exeecutive has paid close attention to the operation of the Council's information and Press services. The monthly *Bulletins* have kept member-firms well informed about the progress of the Council's work. The executive believes that this service is appreciated by member-firms. In the Council's external relations, many new contacts have been developed with representatives of the Press. Information about the industry and its products has been supplied to many publications both as regular Press releases and as special articles. These items of news and contributions have occupied almost a thousand "column inches." Considerable prominence was given to the Council's statement about the price increases of the industry's raw materials.

(*Continued on page* 698 *at foot of col.* 2)

News in Brief

AS FROM JULY 1, the registered office of the Climax Molybdenum Company of Europe, Limited, will be at 99, Pinstone Street, Sheffield, 1.

H. J. ENTHOVEN & SONS, LIMITED, announces that manufacture of rigid polyvinyl-chloride tubing has started at the company's Croydon works.

THE WORKS of Bruce Peebles & Company, Limited, engineers, of Edinburgh, will be closed for the Edinburgh trades holiday from July 1 to 18.

PLANS have been approved for the erection of offices at Templetown, South Shields, for Charles W. Taylor & Son, Limited, ironfounders and engineers.

THE WORLD'S largest blast furnace went into production last week at the Great Lakes Steel Corporation plant on Zug Island in the River Rouge.

BIRCO MOTOR CYLINDER COMPANY, LIMITED, has had plans submitted for the erection of a conveyor shop and foundry extensions off Union Road, West Bromwich.

BRITISH ROPES, LIMITED, Doncaster, has made two eight-mile long steel ropes to be used by a Peruvian mining company for an aerial ropeway over a 16,383-ft. peak of the Andes.

THE PRODUCTION TARGET of the Government of India's Chittaranjan locomotive workshop, at present averaging 10 wide-gauge locomotives a month, has been raised to 200 units a year.

AN INVITATION is to be extended to the British Association for the Advancement of Science to hold its annual meeting in Glasgow in 1958. The last meeting of the Association in city was in 1928.

THE Birmingham Research Station of the Gas Council will in future be known as the Midlands Research Station, as it is now accommodated in the new laboratories at Wharf Lane, Solihull (Warwickshire).

IN THE LATEST American cars, 48 per cent. more aluminium is being used than in last year's models, according to a survey carried out by the Aluminium Company of America. The average 1955 car contains 29.6 lb. of aluminium.

Mr. PHILIP W. GIBBONS, of Henry Gibbons & Sons, Limited, ironfounders, Fareham, Hants, has taken over the business of the Grantham Ironworks, Limited, Springfield Road, Grantham, and will take personal control of the concern.

AN ORDER has been gained by Head Wrightson Processes, Limited, Thornaby-on-Tees, in conjunction with the Fluor Corporation of the United States, for two gas-dehydration plants for the Gas & Fuel Corporation of Australia. The plants will dehydrate 18,000,000 cub. ft. of gas daily.

THE GIANT CANTILEVER CRANE, which has straddled the stockyard at the Broad Oak Works of Markham & Company, Limited, mining, mechanical, and structural engineers, of Chesterfield, since 1906, is now being dismantled. The crane is 120 ft. high with an overall length of cantilever of 253 ft.

NINE EMPLOYEES of Cameron & Robertson, Limited, aluminium and iron founders, of Kirkintilloch, near Glasgow, have been presented with medals and cheques for more than 50 years' service with the company. Three further medals were presented to the widows of men who had previously qualified.

IN ADDITION to the normal monthly intake, an order valued at £225,000 for 548 Diesel engines for direct export has been placed with F. Perkins, Limited, Peterborough, by P. Petropoulos & Company, the company's distributors in Greece. Deliveries are to be spread over the next 10 weeks.

THE CHAIRMAN of the Tata Iron & Steel Company, Limited, said on his return to India from the United States that he had hopes of obtaining a $60,000,000 (£21,500,000) loan for the company to expand its steel mill. Technical aspects of the question, he said, were being studied by American bankers.

IN AN EXPLOSION, followed by a fire, on the Slough Trading Etate early this month, some twenty factories were severely damaged, including the foundry of Slough Metals, Limited, next door to where the fire started. Despite extensive damage to the foundry roof, arrangements are being made to continue production.

A LIST of publications issued by the Aluminium Development Association, 33, Grosvenor Street, London, W.1, gives details of the Association's information bulletins, applications brochures, research reports, and reprinted papers and articles; it also includes books dealing with the association's membership, policy, etc.

THE FOUNDRY at the works of Arthur Lyon & Company (Engineers), Limited, electrical engineers, Barnack Road, Stamford, Lincs, is shortly to be closed, following a reorganization in the Newage group of companies of which this company is a member. The closing of the foundry will provide more floor space for other production.

THE NEW EXHIBITION of Newton, Chambers & Company, Limited, at Thorncliffe, has now been almost completed on its site adjoining the apprentices' training centre. The exhibition has been moved to permit the building where it was originally housed to be used as offices. It now includes a spacious reception hall and a cinema to seat 60 people.

BORAX CONSOLIDATED LIMITED announced recently that they have appointed Lazard Bros. & Company, Limited, in London, and Lazard Frères, New York, Lee Higginson Corporation and F. Eberstadt & Company, of New York, to act as their financial advisers in connection with certain corporate and financial matters at present under consideration.

A WATERWHEEL, which is nearly 300 years old, is still in use by W. Tyzack, Sons & Turner, Limited, saw and file makers, etc., of Sheffield. The wheel works a 3-cwt. steeling-hammer head at 250 blows a minute and the company finds it is more efficient than modern methods in that it can vary the rate of blows per minute and keep the weight of the blow constant.

A FURTHER ORDER for two 200-mw steam turbo-alternators has been awarded to the English Electric Company, Limited, by the Central Electricity Authority for the new power station proposed at High Marnham on the River Trent. When completed the station will be the largest in the country with a total installed capacity of 1,000,000 kw generated by five such turbo-alternators.

A NEW ORGANIZATION to make available the waste products of atomic power plants for industrial purposes such as the manufacture of new types of chemicals and the speeding up of existing chemical manufacturing process has been formed by the UK Atomic Energy Authority. Eventually the whole of the fission products from Britain's atomic power stations will be used for industrial, medical, and research purposes.

AN ANNOUNCEMENT by Philips Electrical, Limited, confirms that the company has given notice of its intention to resign from the Electric Lamp Manufacturers' Association as from July 1. It is stated that this decision results from disagreement on certain matters of

News in Brief

policy which could not be reconciled after long negotiations. Some measure of co-operation is likely to continue with the remaining ELMA members, however, in the future.

AT a Yorkshire regional conference on "Discipline Under Full Employment" at Sheffield recently, Mr. W. Holland, personnel officer of the weighing machine firm of W. & T. Avery, Limited, speaking on "Human Relations," suggested that some foremen made full employment and the Welfare State an excuse for failing in their job. He stressed that the foreman should be a good leader of his own group and a good subordinate to the person above him.

IT WAS "Open Day" for parents of the 93 apprentice-trainees of the Derby locomotive works training school, on June 15. In his speech Dr. T. Heap, Principal of Derby Technical College stressed the importance of technical training. After the reception, parents were able to make a tour of the lecture-rooms, and the sections devoted to patternmaking, moulding and casting; smithing and forging; plate and sheet-metal working, turning and machining; fitting and assembly, etc. Among those present were Mr. T. F. B. Simpson, works manager, and Mr. R. E. Frank, chief instructor of the works training school.

SIR MURRAY STEPHEN, Lord Lieutenant of Lanarkshire, formally opened the new electronic and aeronautic laboratories at the Burnbank School of Engineering, Hamilton, early this month. Mr. Wm. Bell, chairman of Lanarkshire Education Committee, who presided, said that the laboratories were provided to give the students additional facilities. They were now well on into the second Industrial Revolution and, as Lanarkshire was an industrial county, they felt that they should be in on this new development. The principal of the school, Mr. R. H. Gardner, said that they were only too well aware of the need for keeping abreast of the great advances made in industry, which were now moving in the direction of automatic factories.

WM. SIMONS & COMPANY, LIMITED, Renfrew, have secured a contract valued at £1,000,000 for the construction of a large and powerful dredger for the Calcutta Port Commissioners. The new vessel is described as a seagoing drag suction hopper-dredger capable of clearing 3,000 tons of sand from the bed of the Hooghly in 40 min., working against the very strong currents of the bar which, in spring tides, sometimes reach a speed of eight knots. The present vessels in the Commissioners' fleet were all built by the Clyde firm, the connection between Simons and the Commission extending over a period of fifty years. The order has been won in the face of intense competition from European and Japanese shipyards, and will provide employment for all trades for nearly two years.

THE CAR in which the late Mr. John Cobb became the first man to reach a speed of more than 400 m.p.h. on land, in 1947, was placed on June 5 in the Birmingham Museum of Science and Industry. Thirty feet, and weighing about 3½ tons, the car was negotiated into the Newhall Street premises of the Museum with some difficulty. The official handing over by the Dunlop Rubber Company, Limited, to the Lord Mayor of Birmingham (Ald. A. L. Gibson), took place on June 22. Cobb used the car in 1939, when he travelled at 350 m.p.h. on the salt flats at Utah in America. Next day, the record was taken from him by Capt. George Eyeston, but in the following year in the same car Cobb recaptured the record, and in 1947 reached the average of 394.3 m.p.h. and achieved 403 m.p.h. in one run.

FOR the new Armstrong Whitworth supersonic wind tunnel, opened at Coventry recently, Bruce Peebles & Company, Limited, the Edinburgh engineers, have built the largest a.c. electric motor ever produced in Scotland. It weighs 34 tons, has an overall length of 18 ft., a height of 7 ft. 3 in., and a width of 8 ft. 6 in. It will develop 10,000 h.p. and when running it will require 43 tons of air an hour to keep it cool. Under full load it will develop 745 r.p.m. It is coupled through step-up gears to two compressors which will run at approximately 5,000 r.p.m. The assembly was completed in the remarkably short time of three weeks. This motor is another example of the specialized work which Bruce Peebles, Limited, who are not organized on mass-production lines, have equipped themselves to undertake.

THE BIRMINGHAM EXCHANGE AND ENGINEERING CENTRE completed its first year's work on June 17. Mr. C. J. Grazebrook, president, and the organizing committee believe that the venture has been completely successful, and that the Centre has assured itself of a permanent place in the British industrial scene, providing as it does, a link between manufacturer and buyer, and offering a new kind of shop window and information centre for Britain's engineering firms. Some 50,000 visitors have called at the Centre in the past 12 months. It has the only permanent engineering exhibition of its kind in Britain and as far as is known, the enterprise is also without parallel anywhere in the world. The foundry industry, it is stated, has been particularly keen to take advantage of the opportunity to display products in the permanent exhibition.

MAGNESIUM ELEKTRON LIMITED is this year celebrating the 21st anniversary of its establishment as a company. To mark the occasion, the company invited representatives of all its licensees in Great Britain, Europe, the Commonwealth and the USA to visit the works at Clifton Junction, Manchester, on June 16 and 17. With the exception of the Commonwealth Aircraft Corporation of Australia, every licensee firm was represented. Some short papers were read by members of the staff of licensees and M.E.L. covering the more recent developments in the magnesium field; discussions were held; and, by courtesy of all the leading UK founders, fabricators and users of "Elektron" magnesium alloys, a remarkably representative exhibition of some of the finest specimens of magnesium products made in Britain were assembled.

LAST WEEK, Lord Brabazon of Tara opened a new 10,000-h.p. supersonic wind tunnel at the Whitley, Coventry, guided missile plant of Sir W. G. Armstrong Whitworth Aircraft, Limited. The plant will enable experts to watch, photograph and record what happens to guided missiles and aircraft when they reach the "heat barrier" speed at which heat, generated by motion, begins to distort the structure. Lord Brabazon said the tunnel was of national importance and praised the firm on its enterprise and ingenuity. The new wind tunnel, developed at a cost of approximately £200,000, and housed in a specially constructed building, is the country's first large-scale unit designed and built under private enterprise. It is capable of giving a continuous wind flow at three times the speed of sound, and has been designed and constructed under the direction of Dr. W. F. Hilton, the company's chief aerodynamicist, and one of the world's experts on high-speed tunnels. The Government and industry generally will be allowed testing time, and Avro Canada, the Dominion member of the Hawker Siddeley group, has asked to be allowed periodic use of the tunnel, which constitutes a major feat of British engineering.

12 months work in every year!

No dirt, dust, steam or smoke . . . no heavy wear and tear on equipment . . . no lengthy "stop" periods for heavy overhauls . . . no huge bills for the replacement of quickly worn-out parts . . . and certainly no wasteful consumption of fuel. That is the Diesel Jones KL100 Rail Shunting Crane. Powered by a Perkins L4 Water-cooled Diesel Engine, the KL100 will lift 6 tons and will shunt 200 tons. *Hire purchase terms arranged.*

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4. **No heavy wear and tear on equipment.**
5. **Shunts and lifts at a moment's notice—is switched off without waste of fuel.**
6. **No waiting for 'steaming time'.**

Range to lift from 15 cwt. to 7½ tons.

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THE 600 GROUP

J138

Raw Material Markets

Iron and Steel

"Back to normal" is not yet a true appraisal of conditions in the iron and steel trade, but a good deal has been accomplished since the rail strike ended and improvement should be progressive. That so little disturbance to production was caused is a tribute to the resourcefulness of the foundries, their suppliers and customers, the railways, and road transport operatives. The foundries were determined to continue operations and keep their workpeople engaged and the vast majority of them succeeded.

Pig-iron was in short supply before the strike and the shortage has been accentuated by the stoppage. There is no lack of openings for the products of the blast furnaces, no matter what trade of iron is concerned. Hematite is in very short supply, and the engineering and speciality foundries will take all available tonnages of low- and medium-phosphorus iron.

The re-rollers suffered badly as the result of the strike, but are now getting back into their stride. Production of small sections and bars, however, is conditioned by the amount of semi-finished steel the mills can obtain, and that has for some time been below requirements.

Finished-steel production suffered during the transport dispute and it will be some time before working conditions are fully restored.

Non-ferrous Metals

A firm tone was established on the London copper market last week when the Metal Exchange cash price advanced by £11 to £351. In three months the rise was even more marked, for at the close the quotation stood at £338 10s.—£13 10s. higher than the previous Friday's figure. In the United States the dock strike, which broke out in midweek, was short lived, but initially it was responsible for a sharp advance in the quotation on the Commodity Exchange, where the market was influenced to some extent by events in London.

On this side, the settlement of the railway strike had no effect on the market. Copper has been the metal most affected by the hold-up of cargoes at the docks in Liverpool, London, and elsewhere. Broadly speaking, however, there is no inherent weakness in copper. There is even talk of the possibility of an advance in the US beyond 36 cents. Chile is reported sold well forward towards the end of the year.

The predicted advance in the American zinc price has materialized and a rise of ¼ cent was seen last week, making the current quotation 12½ cents. Stocks in producers' hands are low, consumption is well maintained, and stockpiling continues. On the London market the tone was firm, prompt advancing by 5s. to £92 10s., while the forward position gained 10s. to close at £91. Lead was featureless and closed without change, at £103, for both positions. Demand from consumers is only moderate. Tin has shown a tendency to appreciate in value of late and was up by 30s. for cash last week, and £1 for three months. Both positions were quoted at £728, which was about £10 higher than a fortnight ago.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* June 16, £347 to £349; June 17, £349 to £351; June 20, £350 10s. to £352; June 21, £349 to £350; June 22, £344 to £345.

Three Months: June 16, £336 to £337; June 17, £338 10s. to £339; June 20, £337 10s. to £338 10s.; June 21, £337 to £338; June 22, £332 to £334.

TIN, Standard—*Cash:* June 16, £729 to £729 10s.; June 17, £729 to £731; June 20, £724 10s. to £725; June 21, £725 to £726; June 22, £725 10s. to £726.

Three Months: June 16, £729 to £729 10s.; June 17, £729 to £731; June 20, £725 to £726; June 21, £725 to £726; June 22, £725 to £726.

LEAD—*Second half June:* June 16, £102 5s. to £102 10s.; June 17, £102 10s. to £102 15s.; June 20, £102 15s. to £103; June 21, £103 to £103 5s.; June 22, £102 10s. to £102 15s.

Second half September: June 16, £102 10s. to £102 15s.; June 17, £102 10s. to £102 15s.; June 20, £102 10s. to £102 15s.; June 21, £102 15s. to £103; June 22, £102 5s. to £102 10s.

ZINC—*Second half June:* June 16, £91 15s. to £92; June 17, £92 to £92 5s.; June 20, £92 5s. to £92 10s.; June 21, £91 15s. to £92; June 22, £91 5s. to £91 15s.

Second half September: June 16, £90 5s. to £90 10s.; June 17, £90 10s. to £91; June 20, £90 15s. to £91; June 21, £90 10s. to £90 15s.; June 22, £90 to £90 10s.

Higher Level of Unemployment

At the end of April the number of people in civil employment was nearly 22,810,000—75,000 more than at the end of March, and 335,000 more than a year previously. There was an increase of more than 20,000 in the manufacturing industries, mainly in the engineering group and in vehicle manufacture. Unfilled vacancies on May 4 numbered 426,000, an increase of 95,000 on the previous year and the highest since August, 1951. There was a decrease of 36,000 in unemployment between April 18 and May 16. Persons registered as unemployed on May 16 totalled 224,000, including 25,000 temporarily stopped. Unemployment was 1.0 per cent. of the estimated total number of employees, compared with 1.2 per cent. on April 18 and 1.4 per cent. in May, 1954. It is estimated that the total working population increased by nearly 40,000 during April.

Council of Ironfoundry Associations

(*Continued from p. 694*)

Constitution

At the request of the Council the executive committee has given much thought to proposals for the revision of the constitution of the Council. One important change which has been proposed is the introduction of a method of weighted voting, to be applied when matters of unusual importance to the industry are under consideration. The executive has recently agreed on a draft which incorporates this and other amendments, and the Council will have the opportunity to consider the document at the annual meeting. The constituent and affiliated Associations have been invited to report their views.

Membership of Executive Committee

At the annual meeting in 1954 Mr. Tom Lee retired from the executive committee and the Council for reasons of health. Mr. Lee's services had been greatly valued. Mr. A. D. Mackenzie was elected to the vacancy. The executive records with pleasure the honour bestowed on Mr. P. Leonard Gould by the Queen, Her Majesty having been graciously pleased to promote him to the rank of an Officer of the Order of the British Empire.

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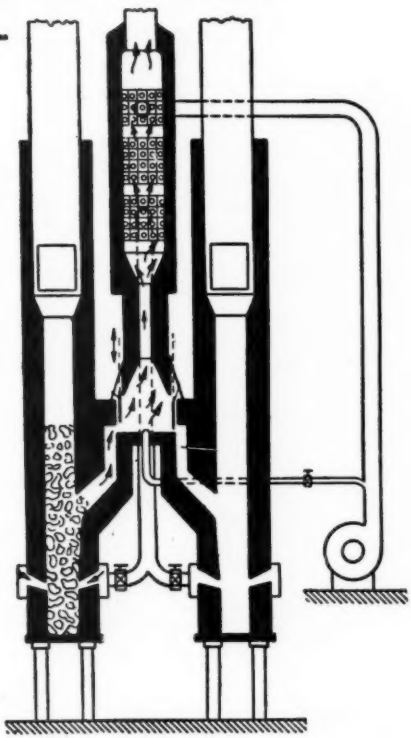

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S.BI.

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

June 22, 1955

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £15 12s. 0d.; Birmingham, £15 5s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £17 13s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £18 9s. 3d.

Scotch Iron.—No. 3 foundry, £18 2s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £20 4s. 0d.; South Zone, £20 6s. 6d.

Refined Malleable.—P, 0.10 per cent. MAX.—North Zone, £21 1s. 6d.; South Zone, £21 4s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £18 2s. 6d.; Scotland (Scotch iron), £18 9s. 0d.; Sheffield, £19 7s. 6d.; Birmingham, £19 14s. 6d.; Wales (Welsh iron), £18 9s. 0d.

Basic Pig-iron.—£15 15s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots).—40/55 per cent., £40 15s. 0d., basis 45 per cent. Si, scale 15s. per unit; 70/84 per cent., £63 0s. 0d., basis 75 per cent. Si, scale 16s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 11s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £161 0s. 0d. to £165 0s. 0d. per ton; 38/40 per cent., £258 0s. 0d. to £262 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 16s. 9d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 19s. 9d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent. C, £83 0s. 0d. to £86 0s. 0d., basis 60 per cent. Cr, scale 25s. 0d. per unit; over 6 per cent. C, £81 0s. 0d. to £84 0s. 0d., basis 60 per cent. Cr, scale 24s. 0d. per unit; 2 per cent. C,* 1s. 10¾d. per lb. Cr; 1 per cent. C,* 1s. 11¼d. per lb. Cr; 0.15 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr; 0.10 per cent. C,* 1s. 11d. to 2s. 2d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per b. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. to 7s. 4d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £259 0s. 0d. to £265 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 52s. 6d. to 70s. 0d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £53 17s. 6d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 5s. 0d.; tested, 0.08 to 0.25 per cent. C, £26 5s. 0d.; hard (0.41 to 0.60 per cent. C), £27 10s. 0d.; silico-manganese, £34 10s. 0d.; free-cutting, £29 6s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 17s. 0d.; silico-manganese, £34 10s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 13s. 6d.; basic, hard, over 0.41 up to 0.60 per cent., C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 15s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £31 1s. 6d.; boiler plates (N.-E. Coast), £33 11s. 6d.; floor plates (N.-E. Coast), £32 10s. 6d.; sectional material, N.-E. Coast, £29 4s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £31 19s. 6d.; flats, 5 in. wide and under, £31 19s. 6d.; hoop and strip, £33 1s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £34 5s. 0d.; black sheets (hand mill), 17/20 g., £43 13s. 6d.; galvanized corrugated sheets, 24 g., £55 4s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £54 7s. 9d.; nickel-chrome, £76 7s. 9d.; nickel-chrome-molybdenum, £86 8s. 6d.

NON-FERROUS METALS

Copper.—Cash, £344 0s. 0d. to £345 0s. 0d.; three months, £332 0s. 0d. to £334 0s. 0d.; settlement, £345 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 3s. 4d. per lb.; rods, 393s. 0d. per cwt. basis; 20 s.w.g., 426s. 3d. per cwt.

Tin.—Cash, £725 10s. 0d. to £726 0s. 0d.; three months, £725 0s. 0d. to £726 0s. 0d.; settlement, £726 0s. 0d.

Lead (Refined Pig).—Second half June, £102 10s. 0d. to £102 15s. 0d.; second half September, £102 5s. 0d. to £102 10s. 0d.

Zinc.—Second half June, £91 5s. 0d. to £91 15s. 0d.; second half September, £90 0s. 0d. to £90 10s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £123 0s. 0d.; rolled zinc (boiler plates), all English destinations, £120 15s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £103 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 7¾d. per lb.; rods, drawn, 3s. 5¼d.; sheets to 10 w.g., 341s. 3d. per cwt.; wire, 3s. 3¼d.; rolled metal, 327s. 0d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £212; B6 (85/15), —; BS249, £226.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £270; HTB2 (38 tons), £278; HTB3 (48 tons), £285.

Gunmetal.—RCH, 3/4 per cent. tin, —; BS1400, LG1 (85/5/5/5), £296; LG3 (86/7/5/2), £305; G1 (88/10/2/¼), £378; (88/10/2/1), £365.

Phosphor Bronze.—BS1400, PB1 (AID released), £385 per ton.

Phosphor Bronze Strip, etc.—Strip, 475s. 9d. per cwt.; sheets to 10 w.g., 499s. 3d. per cwt.; wire, 4s. 10¾d. per lb.; rods, 4s. 3d.; tubes, 4s. 1¼d.; chill cast bars: solids 4s. 4d., cored 4s. 5d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 1d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 6¼d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 5¼d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £108 0s. 0d. Nickel, £519 0s. 0d. Aluminium, ingots, £163 0s. 0d.; aluminium bronze (BS1400), AB1, £342; AB2, £350. Solder, brazing, BS1845, 2s. 10d. lb.; granulated, 3s. 2d. lb.

* Average 68-70 per cent.

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Personal

Mr. H. S. WINGATE, president of the International Nickel Company of Canada, Limited, has been appointed a director of the Bank of Montreal.

Mr. F. HOROBIN, who was in charge of the pattern-shop for 40 years, has retired after 45 years with Bamfords, Limited, agricultural engineers, of Uttoxeter (Staffs).

Mr. ARTHUR SYKES, technical director of David Brown & Sons (Huddersfield), Limited, has received a presentation from his fellow directors on completing 50 years' association with the company.

Mr. R. T. COLLINS has been appointed senior project engineer in the Midlands for Sharples Centrifuges, Limited, Stroud (Glos). Mr. G. H. DUFFIELD has been appointed to a similar post for the north of England.

Mr. J. F. STANIER, chairman and managing director of the Renishaw Iron Company, Limited, has been appointed a part-time member of the East Midlands Electricity Board to succeed the late Mr. J. T. Graham.

While on holiday at Gibraltar, Mr. J. PARAVICINI, technical director of the Britannia Iron & Steel Works, Limited, Bedford, and his wife, attended the first garden party given by the new Governor of Gibraltar and Lady Redman.

Mr. PERCY EVANS has been appointed home sales manager of the Brush Electrical Engineering Company, Limited, Loughborough, and is responsible for the organization and operation of the company's branch offices in Great Britain.

After serving for 17 years with Glow-Worm Boilers, Limited, Milford, near Derby—the last five years as sales director—Mr. G. A. FLANDERS has joined Fortafix, Limited, manufacturers of technical adhesive cements and compounds, of Peterborough, as sales director.

Mr. JOHN ("JACK") SMITH, who is employed in the toolroom of Newton, Chambers & Company, Limited, at Thorncliffe, near Sheffield, is to retire shortly on reaching the age of 70. He has been with the company since 1898, when, as a boy of 13, his wages were 10d. a day, or 5s. for a 54-hour week.

Lord BURGHLEY, chairman of Birmid Industries, Limited, has been elected a vice-president of the executive of the International Olympic Committee. Chairman of the Birmid subsidiaries, including Birmingham Aluminium Casting (1903), Limited, and Sterling Metals, Limited, he is himself an Olympic Games gold medallist.

At the annual general meeting of the Ironfounders' National Confederation held on June 11 in Buxton, Mr. R. CHISHOLM of the Ellerby Foundry, Limited, Leeds, was re-elected chairman, and Mr. C. MARLEY, of R. & A. Main, Limited, London, and Mr. C. J. GRAZEBROOK of the Grazebrook Foundry, Limited, Dudley, were elected vice-chairmen.

Mr. R. F. A. SAMPSON, a local director, who on the administrative changes made by Newton, Chambers & Company, Limited, at the beginning of last year was given special responsibility for London interests, has been obliged to rest, under medical care. Mr. Sampson has been with the company since 1930 and is one of the founders of the Institute of Export.

Viscount WEIR, who retired from the chairmanship of G. & J. Weir, Limited, the Glasgow engineers and founders, at the annual meeting on June 14, was presented with a pair of silver Victorian candelabra, a gift from the 8,000 employees of the Weir group of companies. Lord Weir has completed 62 years with the company. Presentations were also made on behalf of the board to two retiring directors of the company, Mr. JOHN SPITTAL, who has 35 years' service, and Mr. ARCHIBALD LAIDLAW, who has served for 51 years.

Mr. G. A. PHILLIPSON, who joined Richard Thomas & Baldwins, Limited, as carbonizing superintendent at Ebbw Vale in 1940, is retiring on June 30 from his duties as manager of the coke ovens at the Ebbw Vale works, although he will continue to serve the company in a consultative capacity. As a result of Mr. Phillipson's retirement, the company has announced three appointments in the coke-ovens department—Mr. W. G. SHEARER as manager, Mr. DAVID A. JENKINS as assistant manager (technical), and Mr. BRYNMOR MORGAN as assistant manager (production).

At the annual meeting of the Society of Incorporated Accountants in London, Mr. A. BLACKBURN was elected a member of the council. Mr. Blackburn, who qualified as an incorporated accountant in 1931, was appointed assistant secretary of the Whitehead Iron & Steel Company, Limited, in 1934 and chief accountant in 1938. He is now a director and secretary of the Whitehead Iron & Steel Company, and a director of Whitehead, Hill & Company, Limited, W. A. Baker & Company, Limited, engineers and founders, of Newport (Mon), and of Godins (The Rollers of Steel Sections), Limited.

The new Mayor of Wolverhampton, Ald. FRANK MANSELL, was the guest at a luncheon, on June 13, of the directors of Guy Motors, Limited, Wolverhampton. He has worked with the firm for the past 29 years, and for 15 years has been convenor of shop stewards at the factory. Mr. SYDNEY S. GUY, chairman and managing director, spoke of his appreciation of Ald. Mansell's tenacity of purpose, clear thinking, balanced judgment, and cheerful disposition. The Mayor thanked the firm for making it possible for him to accept the office and Mr. Guy for his personal help and encouragement.

Mr. J. WHITEHEAD, a director of David Brown Corporation, Limited, and general manager of the tractor group, has relinquished his directorship of Aston Martin, Limited, and Lagonda, Limited, in order to concentrate on new developments arising from the recent David Brown acquisition of a controlling interest in Harrison, McGregor & Guest, Limited, agricultural engineers, of Leigh, Lancashire. Mr. L. V. GALLAGHER, who has been manager of the Automobile Division of David Brown Tractors (Engineering), Limited, for the past 18 months, has now rejoined the agricultural side of the organization as manager of Harrison, McGregor & Guest, Limited.

Obituary

Mr. HERBERT ROUSE, local director and sales director of William Jessop & Sons, Limited, steel manufacturers, Sheffield, has died in hospital at the age of 56. He was an expert on the forgings and steel castings side of the special steels industry, and had been connected with the firm for 35 years.

Mr. EDGAR JOSEPH THACKERAY, Clerk to the Faculty of Metallurgy at Sheffield University for 50 years, died on June 13 at the age of 66. He started as a clerk in the department of metallurgy at the old Sheffield Technical College in St. George's Square in 1904, and was one of the few people present at the opening of the new university buildings by King Edward VII in 1905, and also at the inauguration last year of the jubilee session by the Queen.

"Fast-Breeder" Atomic Energy Station

John Thompson, Limited, Wolverhampton, has been entrusted by the United Kingdom Atomic Energy Authority (Industrial Group) with a major engineering contract in connection with the Dounreay nuclear power station. The Dounreay station, as announced in the Government White Paper ("A Programme of Nuclear Power," February, 1955), is the first "fast-breeder" reactor to be built in the United Kingdom as a full-scale experimental model, capable of producing power.

The work entrusted to John Thompson, Limited, involves the development in collaboration with the United Kingdom Atomic Energy Authority of methods of fabrication for the liquid-metal circuits, the design of complete steam and water equipment, the manufacture of the whole of the fusion-welded stainless-steel vessels, liquid-metal pipe-lines, primary and secondary heat-exchangers, boiler drums and of the associated plant, valves and instrumentation, together with the feed-water treatment plant. The company has developed a separate department to deal with this contract, and manufacture has commenced.

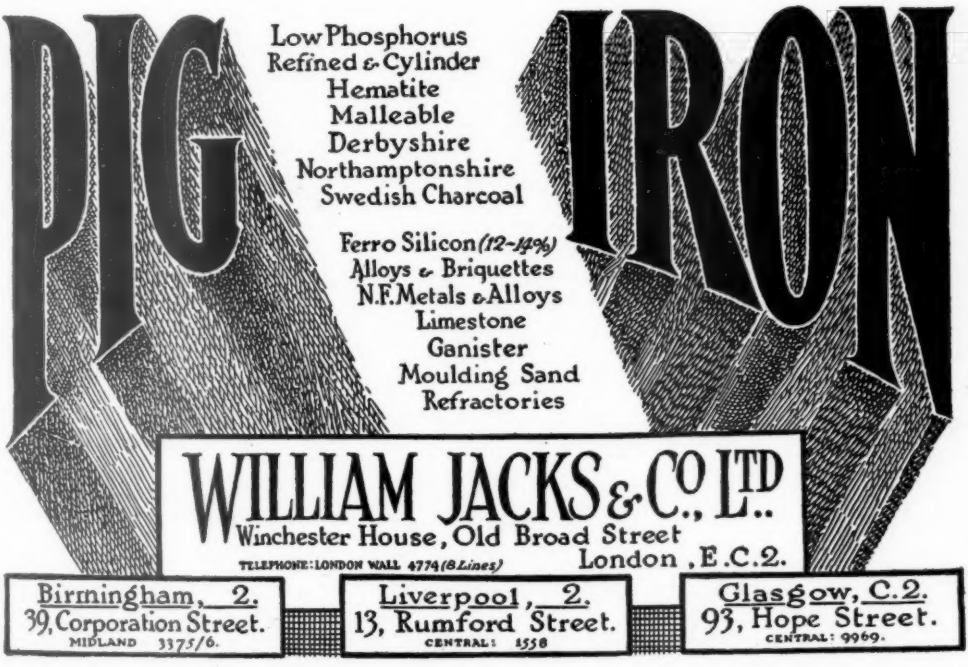
An X-Ray Unit. An eight-page pamphlet received from Solus-Scholl, Limited, 18-22, New Cavendish Street, London, W.1, describes and illustrates a 300-kv. constant potential X-ray unit well suited for use with light-alloy castings or steel sections 4 in. thick. It is available to readers on writing to New Cavendish Street.

National Foundry College

Following the precedent set in previous years, students from the National Foundry College, Wolverhampton, have spent a week of extra-mural activity in touring foundries. This year, they visited Scottish works, the following being the itinerary: *Monday, June* 6, Carron Company, Falkirk, and Smith & Wellstood, Limited, Bonnybridge; *Tuesday,* Babcock & Wilcox, Limited, Renfrew, and Harland & Wolff, Limited, Govan; *Wednesday,* Argus Foundry, Limited, and G. & J. Weir, Limited, both of Cathcart; *Thursday,* Clyde Alloy Steel Company, Limited, Motherwell, and Stewarts and Lloyds, Limited, Tollcross; *Friday,* Glenfield & Kennedy, Limited, Kilmarnock. In each case hospitality and informative guides were provided by the receiving firm.

"Aspects of Steelfoundry Practice."—Mr. H. Hart, the Author of the Paper under this title appearing in the JOURNAL, June 9 and 16, points out that an error has occurred in editing, which may cause misunderstanding. On page 619, under "Atmospheric Pressure," the passage beginning "Lack of feeding . . . etc., should read "Feeding from this point created riser cavities." A further error occurs on page 652 where under the heading "Porosity" (*c*) should be read for (*b*) in the last sentence beginning "Metal below category. . . ."

LILLESHALL COMPANY, LIMITED—Mr. G. K. N. Smith, Mr. C. R. Nicholls, secretary-accountant, and Mr. R. J. Lakelin, the company's works manager, have been appointed to the boards of the company and of the Lilleshall Iron & Steel Company, Limited.



CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Twenty words for 5s. (minimum charge) and 2d. per word thereafter. Box Number 2s. extra (including postage of replies).

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Tuesday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

HEAD FOUNDRY FOREMAN (age 43), M.I.B.F., seeks position of representative. Willing to be trained if possible. London Area preferred. Box HF342, FOUNDRY TRADE JOURNAL.

FOUNDRY EXECUTIVE, age 36, requires position as FOUNDRY or GENERAL MANAGER. Widely practised in organisational and technical aspects of scientific management by planning, methods engineering, motion and time study, standard costing. Experienced in handling large staff and shop personnel, and all commercial problems of founding business. Box FE341, FOUNDRY TRADE JOURNAL.

EXPERIENCED FOUNDRY MANAGER / FOREMAN (45), M.I.B.F., life experience Grey, Malleable, Non-ferrous, now Wales, desires position Midlands. Housing appreciated.—Box EF354, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

PATTERNMAKERS required, used to first-class Wood and Metal work. Excellent conditions, canteen, music while you work, etc., top wages and bonus, by the oldest (85 years) established firm, with the absolute highest reputation. Main suppliers for many years to all firms of importance in the entire country and the finest Plant and Equipment in the world.—Apply WRIGHT & PLATT, LTD., the World's Largest Engineering Patternmakers, Irving Street, Birmingham. Vacancies at Manchester branch. Apply Springfield Lane Works, Salford, 3.

SUFFOLK IRON FOUNDRY (1920) LTD.
STOWMARKET, SUFFOLK.

A STAFF vacancy exists for the position of FOREMAN in the Vitreous Enamelling Shop. The position calls for a progressive and conscientious man, capable of controlling mixed labour and with a good knowledge of the latest V.E. techniques. Good remuneration with Staff Pension and Life Assurance Scheme.

WOOD PATTERNMAKER and MACHINE MOULDERS required for medium sized Malleable Iron Foundry. Good rates of pay and bonus.—Apply to PERSONNEL OFFICER, Britannia Iron & Steel Works, Ltd., Bedford.

SITUATIONS VACANT—*contd.*

TEXTILE MACHINERY MAKERS LTD.,
require
GENERAL MANAGER
for their subsidiary company
PLATTS (BARTON) LTD.,
URMSTON, MANCHESTER

A man of outstanding calibre and record, with strong engineering qualifications and good knowledge of modern foundry practice is required. He will preferably have an engineering degree and must have had successful experience in large scale management and administration.

The salary and generous non-contributory pension and life insurance arrangements will fully recognise the considerable responsibility of the post, which affords ample opportunities for further advancement.

Applications in strict confidence should be addressed to:-

THE MANAGING DIRECTOR,
TEXTILE MACHINERY MAKERS LTD.,
HARTFORD WORKS, OLDHAM

marked "General Manager".

They should give age, full details of experience and names of referees who will only be approached by agreement.

MOULDERS required, non-ferrous. High rates of pay for competent men.—Apply RYCROFT & Co., LTD., Westcroft Foundry, Great Horton, Bradford.

SOUTH AFRICAN Foundry Equipment Company requires for Johannesburg a GENERAL MANAGER, having sound knowledge of the Foundry Industry and preferably of the marketing of foundry machinery, including shell moulding equipment. A salary of not less than £1,500 and a seat on the Board would be offered a suitable man who should be less than 40. Family removal expenses would be reimbursed.—Apply in strict confidence, with full details of qualifications, past employment, present salary and personal information, to Box SA329, FOUNDRY TRADE JOURNAL.

FOUNDRY Layout is a job which requires first-class DRAUGHTSMEN. Ford Motor Co., Ltd., of Dagenham, Essex, is a firm which calls for first-class draughtsmanship. Could you, like their present team, satisfy this requirement?

Our mechanised foundries are already unique in this country. Development plans have already been put into operation, which will make them of world interest. Could you contribute to this truly progressive project?

We need keen, energetic men, of at least O.N.C. standard, and our Salaried Personnel Department will be glad to hear from you. Our commencing rates are good and our pension scheme is generous. Please quote reference KDL/NS in your reply.

SITUATIONS VACANT—*contd.*

TECHNICAL REPRESENTATIVE.

A VACANCY exists with a company of repute for a Technical Representative to visit foundries in Staffordshire / Shropshire area. Applicants should have a knowledge of the foundry industry. This post calls for a high standard of integrity and initiative, and provides ample reward for hard work. Applicants should be between 25 and 40. Superannuation; car provided; full training given.—Box TR352, FOUNDRY TRADE JOURNAL.

WANTED.—Experienced MOULDER to take charge of the Sand Rammer Section of the Foundry. Varied work up to 10 cwts. Regular job for the successful applicant. Please state age, experience, and salary required. Also ASSISTANT FOREMAN required for the Machine Moulding Section—North Wales area.—WE346, FOUNDRY TRADE JOURNAL.

CATTON & COMPANY, LIMITED, of Leeds, require a RADIOGRAPHER to initiate and develop a Radiographic Department serving a Steel Foundry. Experience in steel castings radiography is very desirable, as is the ability to work with the Inspection and Methods Departments in the field of castings quality control. Replies, stating details of training, experience to date, and salary required to CATTON & Co., LTD., 29, Chadwick Street, Leeds, 10. Assistance with Housing Accommodation will be given if required.

MANAGER required for up-to-date Non-ferrous Foundry producing high-class work in all alloys, including Monel, Aluminium Bronze and Aluminium. Must have good experience quantity production light castings on Moulding Machines. Salary secondary to ability, every chance given to advance in status with growing firm. House can be made available in good district if required.—Box MR328, FOUNDRY TRADE JOURNAL.

OWNERS of small foundry at Ketley are considering producing Rainwater Castings and invite applications from experienced light castings foundryman to take charge of production.
BRIGGS, Park Road, Birstall, Leicester.

CATTON & COMPANY, LIMITED, of Leeds, required a YOUNG MAN (National Service obligations completed) as ASSISTANT in their Methods Department. Ability to read casting drawings essential, foundry experience and a good level of education is desirable. This is an excellent opportunity for a young technician to broaden his experience in the carbon and alloy steel casting fields and has good future possibilities. Replies, stating details of education and experience, to CATTON & Co., LTD., 29, Chadwick Street, Leeds, 10.